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## ORIGINAL ARTICLES

### THE FEBRILE TYPES OF ERYTHEMA MULTIFORME AND ERYTHEMA NODOSUM

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THERE are two types of erythema multiforme which are of special interest to the internist: (1) the form first noted by Willan in 1808, the description of which was subsequently elaborated by Osler in a series of papers (1895-1914) on "The Visceral Manifestations of Erythema Exudativum Multiforme", and (2) the febrile type.

It is not my purpose to discuss the first type at any length as this has been done not only by Osler but also in more recent years by Foster, Christian, Morrison and others. It suffices to point out that the chief characteristics of the visceral form are the frequency of recurrences, the variability of the skin eruption in different attacks, the association with acute abdominal pain due to exudative processes in the gastrointestinal tract, the frequency of inflammatory complications, particularly in the kidneys, and the relatively high mortality. Occasionally, as in Herrmann's patient, fever may be a prominent feature.

The chief aim of this communication is to call attention to the febrile type of erythema multiforme, to discuss its relation to the febrile type of erythema nodosum and to consider the possibility that the two conditions are of similar etiology. There is nothing original in the view that the ordinary types of erythema multiforme and erythema nodosum are both manifestations of the same process. Pusey and Ormsby both support this in their excellent text books and many other dermatologists concur. It seems worth while, however, to emphasize this same relation in the febrile types.

#### THE FEBRILE TYPE OF ERYTHEMA MULTIFORME

In the United States but little attention appears to have been paid to the fact that there is a febrile type of erythema multiforme which has all the earmarks of an independent infectious disease. As I have seen only five well-defined cases in hospital and consultation work in the past ten years I judge that it is not of very frequent occurrence in this vicinity. Two of these patients were nurses in the New Haven Hospital and, as I shall point out later in the

discussion, the febrile type of erythema nodosum also occurred among hospital employees during the same period.

The symptomatology of the affection can perhaps best be indicated by giving one or two typical case histories:

E. K., a student nurse, entered the New Haven Hospital January 16, 1915, complaining of pain and stiffness in the knees. The patient stated that about two weeks before entrance she had a sore throat and an ulcerated tooth. The pain and stiffness in the knees began January 15; the left elbow was also painful. There was no redness or swelling of the joints.

The past history and the family history were negative. The patient had never had rheumatism, chorea, or tonsillitis.

Examination by Dr. Tileston January 17 showed some enlargement of the tonsils. The cervical nodes were moderately enlarged, especially those at the angles of the jaw. The lungs were clear. There was a soft systolic murmur at the apex of the heart. The spleen and liver were not enlarged. On the right side of the forehead, right cheek and back of the neck were a dozen red, flat, papular lesions about 1 cm. in diameter; several showed vesiculation. There was a herpetic eruption just external to the left nostril. Over the front of both legs were large, red, tender, infiltrated areas, the largest 3 cm. in diameter; one showed yellowish discoloration. There were three erythematous patches on the back of the left elbow.

The patient was seen by Dr. Ralph A. McDonnell, the dermatologist to the Hospital; his diagnosis was erythema multiforme, nodose on the legs, vesicular on the neck, erythematous on the elbows.

The urine contained the slightest possible trace of albumin and no sugar. Microscopically there were a few leukocytes and a few squamous epithelial cells.

The leukocyte count on entrance was 9,000, with a differential count of 75% polymorphonuclears, 4% large mononuclears, 20% small mononuclears, and 1% eosinophiles.

The patient ran a fever ranging from  $F. 98^{\circ}$  to  $F. 101^{\circ}$  from January 16 to January 21; the daily exacerbation was usually in the afternoon. The pulse ranged during this period between 85 and 90 per minute. The respirations were normal. The rash faded within a week and the patient recovered promptly.

Following is the history of a much more prolonged case:

K. T., a student nurse, aged 23, was admitted to the Hospital January 4, 1925, with fever and headache.

The patient stated that for six weeks preceding the onset of acute symptoms she had lost weight and was abnormally fatigable. A day following the onset of a menstrual period she had a mild chill with pain in the chest and a feeling of exhaustion. The following day high fever and a persistent headache appeared.

The patient had nephritis at six and also had measles, chickenpox and whooping cough as a child. She had influenza as an adult. She has not had rheumatism, scarlet fever or typhoid fever.

Her father and mother were both dead of cardiovascular disease. The family history was otherwise negative.

On admission January 4 her temperature was F. 101°, her pulse 120, and her respirations 25. She was well nourished. The face was flushed. The skin was warm and dry. There was slight injection of the tonsils and fauces. The lungs were clear. The heart sounds were clear and of good quality. The abdomen was not tender. The liver and spleen were not palpable. The extremities were normal.

January 7 Dr. Marvin noted over the forehead numerous small, red, elevated, indurated skin lesions. These extended to the scalp and were also present in the interscapular and infrascapular regions. There were several slightly enlarged cervical glands. The throat was clear. The heart, lungs and abdomen were negative. The spleen was not palpable.

January 9 Dr. F. G. Blake noted numerous pinkish-brown macula-papules, 0.5 to 1 cm. in diameter, on the forehead. There was a pink, circinate, slightly tender, indurated lesion on one forearm which seemed to be beneath the epidermis. There were numerous purplish-brown and greenish-yellow, moderately indurated lesions over the legs; these were most numerous over the lower legs and the recent ones were tender; they were irregular in outline, and varied from 1 to 4 centimeters in diameter.

January 12 Dr. Marvin noted that the skin lesions had faded materially. The fever continued. The heart, lungs and abdomen were negative.

January 13 I noted that the internal organs were negative. The spleen was not enlarged. The skin eruption was a polymorphous one with patches of erythema and nodular lesions on the legs, papular lesions on the arms and forehead, which in the latter place had fused, forming large areas showing some desquamation.

During the course of the illness three blood cultures were taken, all of which were negative. A stool culture was negative for organisms of the typhoid group. Repeated examinations of the urine were negative. An X-ray of the chest was negative. The leukocytes on different occasions varied from 10,000 to 12,000 per cubic millimeter and the differential counts showed from 78 to 85 per cent. of polymorphs, from 8 to 13 per cent. of small mononuclears, from 4 to 7 per cent. of large mononuclears, and none to 2 per cent. of eosinophiles.

The fever lasted 23 days, ranging between F. 102.5° and F. 103.5° for the first two weeks, from F. 100° to F. 102° in the third week, from F. 100° to F. 101° in the fourth week, and then gradually dropping to normal. The skin lesions gradually faded and the patient made a complete recovery without complications.

In these two patients and in three others seen in private practice during the same period we had (1) a prodromal period with fever and in some patients joint pains or general aching, (2) following this the appearance of erythema multiforme and (3) a period of convalescence. In

one of the patients there was a history of being below par for some weeks preceding the acute illness and in one or two or them there was evidence of infection in the upper air passages. In one patient the onset was very sudden with no involvement of the air passages. In one patient, a woman in the seventies, the disease resulted fatally but no autopsy was obtained.

During the same period there were seen, mostly in the hospital, seven patients, three of them hospital employees, with the febrile type of erythema nodosum, all of whom recovered. It is to be noted that in the cases diagnosed erythema nodosum other types of skin lesion occasionally appeared. In one patient, for example, there were numerous purpuric spots on the backs of the legs. In another patient an urticarial eruption was present.

There were also seen during this period two patients with erythema multiforme following diphtheria with antitoxin treatment, one following typhoid fever, two following tonsillitis, one following bronchitis and bronchopneumonia, one in the course of subacute bacterial endocarditis, one following scarlet fever with otitis media, one following a hysterectomy in a syphilitic woman and two patients with erythema nodosum, one following sinusitis and the other following the administration of bromides.

It is clear from these observations that both erythema multiforme and erythema nodosum may appear (1) secondary to infections or toxic processes or (2) as apparently idiopathic diseases. This conclusion is confirmed by opinions culled from the literature.

In secondary cases Saisawa has described erythema multiforme following infection with a bacillus of the influenza group. Fischl and others have described a syphilitic type of erythema nodosum and Joynt has described erythema nodosum following measles. McEwen, Schamberg and Schweitzer have noted erythema multiforme in association with general sepsis.

Regarding the primary cases we may point out that Jonathan Hutchinson believed that erythema nodosum was an entity similar to the acute exanthems (Moses). Trousseau classed erythema nodosum with the eruptive fevers (Caussade, etc.). Lewin in 1876 stated that exudative erythema may occur in epidemic form and was then probably due to a contagium like the other exanthemata. Lendon, an Australian clinician, published a book in 1905 supporting the contention that there is a specific form of erythema nodosum which he calls "nodal fever". Caussade and his co-workers say of erythema nodosum, "In many cases it presents itself in the form of a specific malady, autonomous, comparable to the eruptive fevers." J. Odery Symes speaks of erythema nodosum as "an acute specific infectious fever."

ARE FEBRILE ERYTHEMA MULTIFORME AND FEBRILE  
ERYTHEMA NODOSUM DEFINITE DISEASE  
ENTITIES?

When an apparently specific infectious disease occurs in the form of isolated cases separated by long intervals of time one is in doubt as to its specificity, particularly when, as in this case, the same condition frequently occurs as a secondary phenomenon in connection with other infections or even intoxications. Inability to discover a causative factor adds to the difficulty. We are forced in such circumstances to seek for indirect evidence and, in the case of a presumably infectious disease, this may take the form of analogy with known infectious processes or such evidence as seasonal occurrence or endemicity.

It is a well known fact that some diseases which are now recognized as infectious have not always been so considered. Poliomyelitis is an outstanding example of this. For years only sporadic instances occurred, and then, as a result of factors probably having to do with the virulence of the causative organism, endemic outbreaks of the disease began to occur and have since been relatively common. In typhus fever and the modified form known as Brill's disease we have an example of a disease usually endemic or epidemic becoming less virulent and appearing in sporadic form. Infectious jaundice is another example of a disease which may occur either sporadically or endemically, and meningoencephalitis offers still another example. Indeed most of the exanthemata may appear either endemically or sporadically.

So far as can be determined the febrile type of erythema multiforme has only once been described as an endemic disease. In 1918 W. H. Guy described an outbreak involving 47 cases of all grades of severity occurring at Camp Travis, Texas. These patients usually ran a fever lasting from four to twenty-one days, though some were afebrile. There was a polymorphous erythematous skin eruption. Relapses were not uncommon and some patients gave a history of previous attacks. Inflammation of the upper air passages was common, and streptococcus hemolyticus was isolated from the tonsils in several patients. Guy was inclined to regard *streptococcus hemolyticus* as a possible causative factor, though serological evidence of this was lacking.

Our own series of cases is altogether too small to permit of any dogmatic conclusion. It is, however, suggestive that cases of both febrile erythema multiforme and febrile erythema nodosum occurred in disproportionate numbers among hospital employees.

Evidence of the occurrence of erythema nodosum as a specific disease is much more convincing than that concerning erythema multiforme. This evidence is also indirect as the

etiology of the disease is in doubt though Rose now isolated polymorphous streptococci (or diphtheroids?) from the nodes in a series of cases.

The following circumstances point to the existence of a definite febrile type of erythema nodosum:

1. The occasional occurrence of several cases in the same family.
2. The occasional occurrence of small groups of cases in institutions.
3. The occasional occurrence of considerable numbers of cases in certain districts over limited periods of time.

In a number of instances several cases of erythema nodosum have occurred in the same family. Thus Anderson and Cooper (1921) reported four cases in sisters all occurring at the same time. Caussade and Monier-Vinard (1922) reported three cases in the same family and in the discussion on their paper Comby states that he had seen three small children in the same family affected at intervals of a few days. Lendon has also observed more than one case in the same family.

Small groups of cases occurring in institutions have been described. Thus Launois describes four cases occurring in a hospital ward, three of which developed in patients who were in the ward for other conditions, following the admission of a patient who was suffering from the disease on entrance. W. L. Symes reports twelve cases occurring in a short period in a home for children which accommodated about 100 girls. Moses reports six cases in the Moabit Hospital between April 8, 1894, and August 10, 1894.

Local outbreaks of the disease occurring in restricted districts over short periods of time have been described by various writers. Wiborg reported 30 cases, mostly occurring in a single month, from the same district in Norway. J. Odery Symes states that in an urban district in Wales 50 cases occurred in five weeks during August and September 1921, most of them in a small area comprising two or three streets. J. S. Clarke, after seeing no cases for four years, saw seven cases in the spring of 1907. E. P. Joynt reported nine cases occurring coincident with an epidemic of measles in 1911 and in the same year J. C. Craig reported four cases, three of them during one week. Joynt's patients all had measles before the erythema but in Craig's series, while measles was also endemic, none of the erythema patients had suffered from the disease.

In addition to this type of evidence there is some proof of a tendency to seasonal occurrence (J. O. Symes) though Lendon claims that this is a negligible factor. It is also to be noted that there is a great predominance of females in

those attacked and that the disease usually occurs in the second and third decades of life.

WHAT IS THE RELATIONSHIP BETWEEN FEBRILE  
ERYTHEMA MULTIFORME AND FEBRILE  
ERYTHEMA NODOSUM?

It is obviously impossible to answer this question with certainty so long as the etiology of the febrile types of erythema multiforme and of erythema nodosum is in doubt. The epidemiological similarities between erythema multiforme and erythema nodosum have been pointed out in the preceding discussion. It may be added that nodose lesions are very common in erythema multiforme and, on the other hand, in patients in whom a diagnosis of erythema nodosum seems appropriate other types of skin lesion, petechiae or urticarial wheals for example, may occasionally be present. It would seem fair to say that an absolute line of demarcation between the febrile types of erythema multiforme and erythema nodosum cannot always be drawn. Nevertheless anyone who has seen many of these cases must, I think, have received the impression that febrile erythema nodosum is a fairly clear cut entity, as clear cut perhaps as measles or scarlet fever.

Some writers suggest possible relationships much more extensive than those discussed above. Moses refers to a possible relationship between the morbus maculosus of Werlhoff, peliosis rheumatica, erythema nodosum, erythema multiforme, acute articular rheumatism and acute endocarditis. Osler suggests that there is a close affinity between erythema multiforme, Henoch's purpura, peliosis rheumatica, urticaria and angioneurotic edema. This paper is concerned mainly with the question of the existence of definite febrile types of erythema multiforme and it is beyond its scope to discuss these interesting questions and the equally interesting ones of the relationship of rheumatism, sensitization and tuberculosis to the erythemas.

It is clear from the preceding discussion that erythema multiforme and erythema nodosum are simply forms of reaction which may be due to a variety of infectious or toxic agents. The same thing is true to some extent of the classical exanthemata. We may have scarlatinaform eruptions or morbilliform eruptions aside from the specific diseases scarlet fever and measles.

In the febrile forms of erythema multiforme and of erythema nodosum we do, however, have clear cut pictures which appear to be properly comparable to the other exanthems but which are obviously, as a rule, much less readily transmissible.

#### CONCLUSIONS

Any conclusions which may be drawn regarding the febrile types of erythema multiforme and erythema nodosum must, of necessity, be tentative. It seems fair to state:

- (1) That there are febrile types of both erythema multiforme and erythema nodosum which are not obviously secondary to preceding infections or intoxications.
- (2) That there is some evidence of an epidemiological nature which suggests that febrile erythema multiforme and febrile erythema nodosum may be specific infectious diseases.
- (3) That there is suggestive evidence that the febrile types of erythema multiforme and erythema nodosum may be manifestations of streptococcus infection.
- (4) It is possible that the two types, febrile erythema multiforme and febrile erythema nodosum, may both be expressions of the same form of infection, though this cannot be proved until the discovery of the etiological agent or agents is satisfactorily substantiated.

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#### PIGMENTATION IN MYXEDEMA\*

BY C. I. KRANTZ, M.D., AND J. H. MEANS, M.D.

CERTAIN skin manifestations are characteristic of myxedema; roughness, dryness and scaling of the skin, thickening of subcutaneous tissues, pallor and yellowish tint due to anemia and to the false edema. Other skin changes

found occasionally have been ascribed to myxedema, such as eczema<sup>1</sup>, scleroderma<sup>2</sup>, and certain erythemas<sup>3</sup>. In the present paper we shall show that brownish pigmentation, clearing rapidly under thyroid medication is sometimes seen in myxedema.

We have recently observed two striking in-

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stances of pigmentation occurring in myxedema and rapidly disappearing under thyroid medication. (Cases I and II.) In view of this we have carefully searched the cases of myxedema treated in this hospital and have found four others of similar sort. In all these, the pigmentation occurred coincidentally with the onset of the classical myxedema symptoms, but in a few cases, histories of longer standing pigmentation were obtained and in these thyroid administration had no beneficial effect. These latter have not been included in the following series.

#### CASE REPORTS

**CASE I.** Mrs. McD., housewife, aged 33 years. (Lab. No. 3066, Hosp. No. W. M. 268326.) Admitted February 12, 1925.

**Complaint**—"My face is getting black; I feel weak and cold all the time."

**History**—The patient had been perfectly well up to one year before entry to the hospital. Then she noticed a dark discoloration of her face, which became more and more intense, especially on her forehead. This same discoloration soon appeared in the axillary regions and along the inner sides of the thighs, but in these regions it was of a lighter color than on the face. With this pigmentation other symptoms appeared and she grew progressively worse, so that when she came to the hospital she gave a typical history of myxedema.

**Physical Examination**—The patient was a somewhat obese woman with the slow, retarded mental and physical activity and the typical facies of myxedema. There was a remarkable pigmentation over her face, which was most marked on her forehead. (See Fig. 1.) However, it was absent about her mouth and around her eyes. It was of a dark brownish color and irregularly distributed in patches, making a striking comparison with the pale skin in the non-pigmented areas. In the axillary regions and along the inner sides of the thighs similar areas of pigmentation were present, but these were of a lighter color and more sparsely distributed than on the face. Aside from other evidences of myxedema, her physical examination was negative.

**Laboratory Findings**—Blood: Smear and count revealed a secondary anemia. Hemoglobin, 70%; red cells, 3,690,000.

**Sugar Tolerance**: Fasting level, 85 mgs. sugar per 100 cc., rising to 104 mgs. in 1 hour after ingestion of 100 gms. sugar.

**Basal Metabolic Rate** (February 11, 1925), minus 33. Pulse Rate, 64. Weight, 132 lbs.

**Basal Metabolic Rate** (March 4, 1925), minus 27.5. Pulse Rate, 69. Weight, 130 lbs.

**Course**—She was given  $4\frac{1}{2}$  grains of Burroughs Wellcome thyroid daily and discharged from the hospital.

March 31, 1925. Improvement slight. Pigmentation is slowly fading.

April 11, 1925. Basal Metabolic Rate, plus 6. Pulse Rate, 80. Pigmentation is markedly decreased. Activity is practically normal and appearance has changed for the better.

May 14, 1925. Basal Metabolic Rate, minus 3. Pulse Rate, 74. Weight, 116 lbs. Pigmentation is still fading. The anemia is improved.

July 18, 1925. Basal Metabolic Rate, plus 13. Pulse Rate, 91. Weight, 110 lbs. The symptoms and signs of myxedema are gone. Pigmentation has practically faded. There is a remarkable change in her appearance now as contrasted with that at hospital entry. Thyroid dosage reduced to 3 grains daily.

August 31, 1925. Basal Metabolic Rate, plus 11. Pulse Rate, 86. Weight, 110 lbs. Pigmentation has

faded entirely. Thyroid reduced to  $1\frac{1}{2}$  grains daily.

Since August, 1925, the patient has been followed regularly in the Thyroid Clinic and there has been no return of pigmentation or of myxedema signs or symptoms. (See Fig. 1.) The basal metabolic rate has always been within normal limits.



FIG. 1. Case I. Above, before thyroid administration. (Note myxedematous appearance and pigmentation, which is most marked over the forehead and cheeks.) Below, after one year of thyroid treatment. (Note disappearance of myxedema facies and pigmentation.)

**CASE II.** Mrs. LeB., housewife, aged 43 years. (Lab. No. 3532, O. P. D. No. 580970.) Admitted to Out-Patient Department October 1, 1925.

**Complaint**—Weakness and anemia.

**History**—For the past year the patient had been having mild symptoms of myxedema, and when she reported to a local hospital, Addison's disease was considered a possible cause of her weakness, anemia and pigmentation. Her skin had become thicker, dryer, and scaled more readily than usual, but in addition she had noticed some irregular yellowish brown marks over her cheeks and below her ears, which she described as blotches or freckles. The same brownish discoloration was present on the backs of both hands near the regions of the thumbs.

**Physical Examination**—The patient was a short, overweight woman with a full, expressionless face and narrowed lid fissures. Her activity was correspondingly lessened and her speech was slow and somewhat indistinct. Over both cheeks and extending below both ears were marked on the right side. On the backs of her hands, especially in the regions of the thumbs, were similar, lighter areas of brownish pigmentation. Aside from other evidences of moderate myxedema, her examination was negative.

**Laboratory Findings**—Basal Metabolic Rate, minus 22. Pulse Rate, 80. Weight, 114 lbs.

**Course**—She was treated in the Thyroid Clinic with 3 grains of thyroid extract daily and her improvement was soon apparent. Her face returned to its normal appearance and she became more alert, both mentally and physically. In one and one-half months the pigmentation had entirely disappeared from her face, but it required seven months of treatment before the pigmentation over her hands had entirely cleared up. Since then she has been followed at periodic intervals and on a daily dosage of  $1\frac{1}{2}$  grains of thyroid extract has had a consistently nor-

mal basal metabolism with no return of myxedema symptoms or pigmentation.

CASE III. Mrs. D., housewife, aged 51 years. (Lab. No. 2, Hosp. No. 158807.) Admitted June 10, 1908.  
*Complaint*—Weakness.

*History*—During the four years preceding her hospital admission, the patient had been having symptoms of myxedema. Her face had become bloated and full and she had become progressively weaker and more dyspnoeic on any exertion. Since the onset of these symptoms she had noticed that the backs of her hands and the upper surfaces of her arms had become darker and more brownish than usual. Other symptoms soon appeared and on entering the hospital she gave a characteristic history of myxedema.

*Physical Examination*—She was a well developed and nourished woman who presented the typical facies and lethargy of myxedema. The skin and mucous membranes were pale, and in contrast to this many irregular areas of brownish pigmentation were scattered over the backs of her hands and over the extensor surfaces of her forearms. A few similar areas were found on her abdomen and on the calves of her legs. Other findings were typical of myxedema, but in addition it was noted that her abdomen was swollen.

*Laboratory Findings*—The blood picture showed a slight anemia.

*Course*—She was given 3 grains of thyroid extract daily and her condition rapidly improved. The areas of pigmentation soon cleared up and her face resumed a normal appearance. The swelling of her abdomen, however, disappeared without any further treatment. During the next few years she lapsed in her thyroid medication and she re-entered the hospital on two subsequent occasions for treatment of the same condition, but she never had any recurrence of pigmentation. She has been followed regularly for many years and during this time she has taken  $1\frac{1}{2}$  grains of thyroid extract daily without the return of any signs or symptoms of myxedema. Her basal metabolism has consistently remained normal since her last hospital entry.

CASE IV. Mrs. McM., housewife, aged 44 years. (Lab. No. 864, O. P. D. 438065.) Admitted to Out-Patient Department July 20, 1910.

*Complaint*—“Weakness and tired feeling.”

*History*—The symptoms of myxedema appeared seven years before, after the birth of her last child. She had noticed that her face had become darker than usual and that her skin was rough and dry. She came into the hospital after an acute gastrointestinal upset.

*Physical Examination*—The patient was a well developed woman with the typical signs of myxedema. Her face was full, skin pale and lips cyanotic. Several irregular areas of brownish pigmentation were scattered over her forehead and cheeks. The examination was negative aside from the changes due to myxedema.

*Course*—She was given 3 grains of thyroid extract daily, but her recovery progressed so slowly that the dosage was increased to 6 grains per day. Under this regime she showed rapid improvement and soon regained normal health and activity. The areas of pigmentation disappeared three months after beginning treatment and have never since returned. She has returned to the Thyroid Clinic at intervals and retains normal health, activity and metabolism on  $1\frac{1}{2}$  grains of thyroid extract daily.

CASE V. Mrs. B., housewife, aged 53 years. (Lab. No. 1836, Hosp. No. W. M. 254160.) Admitted January 19, 1923.

*Complaint*—Weakness.

*History*—The symptoms of myxedema appeared one year before and had been growing progressively

worse, so that on entry to the hospital she presented a characteristic picture of thyroid insufficiency. In addition to the swelling of her face she had noticed a brownish discoloration scattered over her face and neck, which had appeared during the past year.

*Physical Examination*—She was an obese woman with characteristic lethargic mental and physical activity. Her face was bloated and her eyebrows were almost gone. Over her cheeks and forehead and along the sides of her neck were irregular areas of excessive brownish pigmentation. Similar areas of even darker color were present on the extensor surfaces of her forearms. The examination was otherwise negative.

*Laboratory Findings*—Blood examination showed a moderately marked secondary anemia. Hemoglobin, 75%. Red cells, 2,400,000.

Electrocardiogram: Flat T-waves and Isoelectric P-waves in all leads.

Basal Metabolic Rate, minus 35. Pulse Rate, 58. Weight, 165 lbs.

*Course*—She was given 3 grains of thyroid extract daily and soon showed signs of improvement in her condition. One and one-half months after beginning treatment all signs of pigmentation had disappeared and normal appearance and activity had been restored. She has returned at periodic intervals and retains normal appearance and activity on 3 grains of thyroid extract daily without the return of pigmentation.

CASE VI. Mr. D., mechanic, aged 53 years. (Lab. No. 2413, O. P. D. No. 507739.) Admitted to Out-Patient Department February 19, 1924.

*Complaint*—“Weakness and general run down condition.”

*History*—A few months before coming to the dispensary, the patient began to show symptoms of thyroid insufficiency. Along with the characteristic skin changes he had noticed a few spots of brownish discoloration between his eyes. Over the backs of his wrists and the calves of his legs similar areas had appeared.

*Physical Examination*—The patient was a moderately nourished man with a dull expression, full face, and slow, retarded activity. His skin was pale and yellow in color except for a few small, irregular spots of brownish pigmentation between his eyes. Similar areas were scattered over the calves of his legs and over the extensor surfaces of his wrists. Over the wrists, however, the pigmentation was of a more yellow color than elsewhere. Other findings were consistent with myxedema.

*Laboratory Findings*—The blood examination showed no marked deviation from the normal.

Electrocardiogram: Flat T-waves and small complexes in all leads.

Basal Metabolic Rate, minus 32. Pulse Rate, 46. Weight, 145 lbs.

*Course*—The patient was given 8 grains of thyroid extract daily and the signs and symptoms of myxedema soon disappeared. The areas of pigmentation receded markedly just after thyroid administration began and up to the present time have cleared up entirely except for small yellowish brown areas on the backs of each wrist. He feels well and active and shows no signs of thyroid lack on 5 grains of thyroid extract per day. His basal metabolism has been consistently within normal limits for the past one and one-half years.

#### COMMENTS

Pigmentation usually affects the more exposed portions of the body and this has also been found true in our series of cases. The face, especially the forehead and cheeks, were involved in five of the six cases and in three

eases the extensor surfaces of the forearms were pigmented. The neck, abdomen, calves of the legs, axillae and inner thighs were each involved in one instance. It is of interest to note that the axillae and inner aspects of the thighs, which are areas of skin contact, were affected in Case I. Pigmentation of the mouth and tongue was not noted in these cases.

The pigmentation described assumed a brownish hue and the weakness, anemia and similarity of pigmentation caused adrenal insufficiency to be considered as a possible cause of these changes in Case II. The areas involved varied from small spots to larger patches and were described in one instance as huge blotches of freckles. The pigmented areas faded under thyroid medication and did not flake off as the superficial skin layers may do in myxedema. The pigmentation, therefore, was not merely a coloration of the uppermost layer of the skin which was ready to scale off, but showed a somewhat deeper involvement. In each instance the pigmentation had come on coincidentally with or shortly after the symptoms of thyroid insufficiency had appeared and it cleared up promptly under thyroid administration. In Case VI, however, small areas of yellowish brown pigmentation remained over the wrists, but it is probable that these areas had been previously pigmented from some other cause and hence did not disappear under this type of treatment.

Pigmentation of this kind may bear a super-

ficial resemblance to that caused by adrenal insufficiency and cases of benign adrenal insufficiency have been described<sup>4</sup>. Here low blood pressure, weakness, loss of weight and pigmentation are the predominant features. A relative or absolute lymphocytosis may occur. Thyroid insufficiency may conceivably cause a disturbance in the action of the adrenals, but in the present status of our endocrine knowledge no dependence or relation has been proven to exist between the adrenals and thyroid in this regard.

#### SUMMARY

1. Six cases of myxedema are reported in which pigmentation was noted. It was more pronounced and more often noted on the exposed surfaces of the body.

2. The pigmentation appeared coincidentally with or shortly after the onset of symptoms of myxedema, but cleared up promptly under thyroid administration.

3. No conclusions regarding its origin are drawn.

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## A COOPERATIVE PSYCHIATRIC SERVICE

### An Outline of the Activities of This Service Established by a Group of Boston Social Agencies

BY ELIZABETH ANN SULLIVAN, M.D.

A PSYCHIATRIST was engaged recently by a group of Boston social agencies\* to work on a cooperative basis. No single agency could afford such a service in the past, and although full use was made of the nerve and psychiatric departments of hospitals, there was an urgent need of a psychiatrist who would work inti-

mately with the particular problems of the individual societies. The out-patient department of the Boston Psychopathic Hospital, as well as the neurological departments of various hospitals, has always been at the service of welfare agencies, but it has been difficult many times, because of individual resistances and prejudices, to get persons needing this special care in contact with the hospitals. The cooperative service in no way tends to duplicate the already existing and well-organized psychiatric facilities in this city but to supplement them. Many patients especially those with mental difficulties, because of the particular character of their illness and their lack of insight, refuse to go to a hospital for examination. Others are too ill to go and still others do not wish to acknowledge maladjustments which have any psychiatric or neurotic element.

Social workers come into daily contact with human problems, many of which require the services of a psychiatrist for their practical so-

\*The agencies cooperating in the present scheme are:

- (1) The Family Welfare Society, formerly known as the Associated Charities of Boston, handles family problems, giving advisory service.
- (2) The Boston Provident Society gives financial assistance to individuals or other agencies.
- (3) The Industrial Aid cares for unmarried men.
- (4) The Cooperative Work Rooms gives training to women in the needle industries, and home work.
- (5) The Massachusetts Association for the Blind aids in the vocational problems and rehabilitation of the handicapped.
- (6) The Speech Readers Guild reeducates and finds employment for the deaf.
- (7) The Women's Educational and Industrial Union finds employment for well and handicapped women and gives vocational advice to trained women.
- (8) The Church Home Society places children under their care.
- (9) The Frances E. Willard Settlement has homes for women.
- (10) The Massachusetts Society for Mental Hygiene.
- (11) The Federation for Placement Work, which originated the idea.
- (12) The Permanent Charity Fund, the principal contributor.

lution. These problems involve those arising chiefly through incipient or frank mental disease, maladjustments in family relationships, mental defect, and behaviour problems of children. It is the function of the psychiatrist to examine the patient physically and mentally and to go over the situation with the worker when making the recommendations, emphasizing the mental hygiene aspect of the case and the underlying mechanisms actuating the individual.

All the agencies have unique and individual problems. The societies dealing with family groups come into contact principally with maladjustments within the family circle, school, work and marital difficulties. Others assist in the rehabilitation, reeducation and vocational guidance of their clients. So important is it for the patient with any handicap to learn to face reality that the social worker needs to understand the mechanisms and resistances at work in each case.

Sixty-six consecutive patients have been examined during the first four months of the co-operative service and forty case records in addition were discussed in conference with the social worker and disposed of without examination. The following six cases have been selected because they represent general types, such as, a psychosis, maladjustment at work, behaviour problems, mental defect, marital difficulty, and unemployment.

#### CASE I. S.

An attractive, intelligent secretary of 20 years of age was referred by her executive, who said that this previously efficient worker was now making constant errors and that she was easily fatigued, claimed that men in the building made advances to her and had unusual visual sensations during her train ride to work.

During the examination the girl was co-operative. She was a high school graduate and lived with her parents in a small town 20 miles from Boston. For the past six months, she had been finding it more difficult each day to go to work, and as the day progressed, her fatigue increased out of proportion to her effort. On the train, although she considered herself fully awake she thought she saw a rat approaching her ready to bite. At her work, she thought that one of the men had made advances to her and he was discharged. She was unusually nervous at the approach of other men. She was deeply indebted to her executive for many kindnesses but really wished to leave the position but did not have courage to do so. She wished to return to the small town, remain at home with her family, and perhaps later, try for some small position near home. She was having a love affair with a young man in her town.

Diagnostically, the girl was developing an anxiety neurosis. It was explained to her that her difficulties in getting to work were escape symptoms and that she really did not want to come to work. Her desire to return to the protection of her parents was retrogression at the time of mental stress to the early childhood protection. Towards her superior she had strong feelings of inferiority. She was told that she must clearly face reality, approach her superior and frankly discuss her situation.

She accepted the suggestion, resigned her position and was placed in an acceptable one near her home town. Her symptoms resolved at once.

#### CASE II. P.

A man of 52 years of age, white, American born, with a common school education was referred to the social agency by the Legal Aid Society, which he had consulted for assistance in prosecuting a series of litigation cases. He claimed persecution by employees of the Boston Elevated Railroad.

On examination, the patient was in good physical condition with no gross physical or neurological disturbance. He was clean, neatly dressed, with no evident deterioration, oriented in all spheres and showed a good attitude toward the examination. In the past he was slightly alcoholic but now abstains. He is married and has three healthy children. In his early life, he worked as a clerk and for the last ten years as an elevator man. Recently because of eccentricities of behaviour, his work was changed from elevator to porter work.

"One night two years ago while riding home on the street car, I stopped to look at the cash register," he complained. "The conductor thought that I was a spotter. The next morning while waiting for my car, the motorman looked at me and pointed me out to the passengers. Since then, they have been following me everywhere even at my work. They put their hands to their hips as to pull guns. I should like to buy a revolver but I would use it only in self defense. You know that I was in the militia and was a crack shot. Lately, wherever I go, I hear people talking about me, calling me names that I cannot repeat. I know that my food has been poisoned and for that reason I do not eat in restaurants. I have feelings of electricity in my legs."

The onset of his first symptoms were dated 15 years ago by his wife when he was unreasonably jealous of her, and in an alcoholic episode threatened her with a revolver. One month ago, he threatened suicide in order to rid himself to his persecutors.

The patient has auditory and somatic hallucinations, illusions, persecutory delusions, an inadequate emotional reaction to his condition and a moderate mental deterioration. He has schizophrenia, paranoid form, and is dangerous. He was committed to the Boston Psychopathic Hospital and thence to a state hospital.

#### CASE III. A.

A bright, undersized boy of 10 years, white, American born of English parents, was referred as a behaviour problem by a placing-out agency. For the past two years, periodically, and daily for the last six weeks, he has defecated any place on the premises, on the floor of his room, under the dresser, and has smeared himself and the walls of his room with feces.

The boy's father was born in England and came to this country in 1910. He appears to be of normal intelligence and good health. He has an excellent attitude towards his family and supports them well. The boy's mother was born in England and was of normal intelligence. She died three years ago from heart trouble and previous to her death she had one attack of peritonitis. She had given birth to three living children, two still births and two miscarriages. Her father was alcoholic and died of cancer.

The patient is the third child. He has had no serious disease but has always been under weight. Even as a baby, his father reports, he was markedly constipated. He was always very stubborn and contra-suggestible. He liked to tease little girls, threw stones at street cars and at other times devoted his attention and interest to playing in mud.

Physical examination showed him to be 10 pounds under weight with enlarged anterior cervical and epitrochlear glands. He had one negative and two doubtful Wassermann reactions. Rectal and stool examinations were negative. (Lumbar puncture was negative.) He has an intelligence quotient of 105.

On questioning, the boy appeared to be anxious to cooperate but was evasive and ingratiating. He could give no reason for his behaviour denying any erotic pleasure or desire to retaliate against his environment. He was in the fourth grade and received high marks in his studies. The various foster homes had exhausted their resources in dealing with him. After each offense he would promise future good behaviour and might immediately repeat some defecatory act. His school companions avoided him but he was shameless.

Diagnostically, the boy has a neurosis of the anal sadistic form, engrafted perhaps upon a hereditary neuro-syphilis. He is receiving some degree of voluptuous pleasure from his perverse acts. In order to more fully study the mechanisms motivating the patient, he was sent to the Boston Psychopathic Hospital for ten days observation. Although soiled on entrance, he was clean during his stay here. Dr. C. Macfie Campbell who saw the boy at the hospital recommended further extensive analysis of the motivating forces. He suggested that the condition be ignored, that the foster mother be instructed to have no further emotional reaction with threats of punishment and attempts to appeal to the emotions of shame or self respect, that a system of rewards be instituted to be continued during good behaviour and that he be returned to a city home where the usual sanitary conditions prevail.

#### CASE IV. M.

An Italian girl of 17 years of age, was referred by a social agency because she was having seizures considered hysterical and the family had requested financial aid because the mother thought it necessary to remain home from work to care for the girl.

The patient was born in Italy and came to the United States when 2½ years of age with her father, mother and one brother. Her father died 13 years ago.

The patient attended school for four years in this country in a special English class. At 16, she went to work and after two months, she stopped work because of her attacks. Her mother was working but also stopped work two months ago in order to care for the girl. The mother neither speaks nor understands English.

The patient gives an inaccurate account of her attacks. It appears that the attacks in their present form are of four months duration. She has one about twice a week and sometimes knows that they are coming by a feeling of dizziness and sleepiness. She has bitten her tongue occasionally and was once incontinent. She states that the attacks are precipitated usually by quarrels with her mother. She is ashamed of her mother's appearance and manners in the presence of strangers. Her mother is over-demonstrative and over-solicitous of the girl's health.

Physically, the girl is well-developed but she has many stigmata of degeneracy. She has an intelligence quotient of 61 and a mental age of nine years and nine months.

Diagnostically, she is feeble-minded and the attacks are probably epilepsy. Treatment in a state school for the feeble-minded is planned and in the interim before her admission, removal to a foster home is recommended. The mother then can return to work and the social aspect of the case relieved.

#### CASE V. T.

A Scotchman, 38 years of age, was referred to a

welfare agency by a hospital social service department where the man had previously gone for relief from extreme fatigue and inability to work. Nine months ago, he came to Boston from Scotland, where he had been employed as a driver of a steam roller. He had worked steadily in Scotland and emigrated in order to improve his condition. He was married and had five healthy children. During the war, he served nearly four years as a stretcher bearer, was not wounded and was in continuous good mental health. His war experience has since not concerned him either consciously or in his dreams. He was always of a happy temperament in Scotland and never had attacks of depression or elation.

Since his arrival in Boston, he has worked a few weeks at a time in various unskilled occupations and then, through fatigue, was forced to resign or he was discharged because he was "too slow." He complained of continuous fatigue, depression, and wished that he might die in order to be no longer a burden. He had not actually considered suicide. He felt that he was physically able to work, and forced himself to make the effort to obtain work; still, he was unable to compete with his fellow workers because of inertia.

On examination, he was found to be a rugged man whose physical examination was essentially negative except for some old infiltrated areas at the tops of both lungs. Lumbar puncture was negative. He willingly cooperated in the examination, adequately reacted to the questions, showed good insight and judgment, had an average intelligence and a likeable personality. He had no hallucinations, delusions, or illusions. He had no paranoid ideas or feelings of guilt or sin. His neurological examination was negative.

Diagnostically, he had a mild depression, conditioned perhaps by the change in climate, different living conditions and environment. For treatment, he was referred to the Psychopathic Hospital outpatient department for psychotherapy.

#### CASE VI. N.

An Italian, 38 years of age, was referred because of a complicated family situation and unemployment due to physical handicap. The patient came to America when he was 19 years of age, returning to Italy a few years later to marry. While in America, he learned to read and write and took out citizenship papers. Although employed at unskilled labor with periods each year of inactivity, he has always sup-

CHART I

Age	Range of Age	Total	Sex	
			Male	Female
Under 10 years of age		9	7	2
10-15 years of age		9	3	6
16-20 years of age		9	2	7
21-30 years of age		12	2	10
31-40 years of age		12	3	9
41-50 years of age		10	4	6
Over 51 years of age		5	1	4
		66	22	44

ported his family and bought a house. He was independent and ambitious for the children.

Two years ago while working in a factory, he strained his back but did not report the condition to the factory hospital because of diffidence. He worked for 18 months after that but for the last six months has been out of work. The pain in his back was growing more severe each day and he finally found it necessary to give up work and go regularly to a hospital for treatment. With the increase in the

severity of the pain, there was accompanying feeling of depression, anxiety, inadequacy and fear of the future. He accused his wife of infidelity. With his feeling of inadequacy and physical disability, he has made many fantastic plans for the future and unreasonable accusations against his wife.

During the interview, the patient was much de-

he resorted to violence. He had hallucinations of hearing but no delusions. Physically, the patient complained of pain in the lumbar region and the right upper arm. On examination, it was found that his back motions were free and that there was mobility of the spine even beyond normal limits. There was slight tenderness at the articulations of

CHART II

No. of cases	Reason for referring case	Diagnosis
12	To determine mental ability (for placement or work)	1 Normal (superior) 3 " (upper level) 3 " (dull) 1 " (neurotic) 3 Feeble-minded 1 Deferred (neurotic)
10	Prolonged unemployment 7 Unemployment (complicated by industrial accident) 3	5 Anxiety neurosis 1 Cerebrospinal syphilis 1 Psychopathic personality 1 Epileptic—Feeble-minded 1 Mental depression 1 Paralysis agitans
6	Suspected mental disease	3 Dementia praecox 1 Normal (pregnant) 1 Psychopathic personality 1 Senile dementia
6	Educational advice	1 Normal (tuberculosis) 2 " (dull) 2 Feeble-minded 1 Congenital syphilis—Feeble-minded
6	Vocational advice	1 Anxiety neurosis 3 Psychopathic personality 1 Feeble-minded 1 Psychopathic personality with dull mentality
5	Marital difficulties	1 Anxiety neurosis 1 Constitutional inferiority 1 Mental depression 1 Psychopathic personality 1 Syphilis
5	Illegitimacy	2 Normal 1 Normal (dull) 2 Feeble-minded
5	Peculiar behaviour	2 Dementia praecox 2 Neurosis (in children) 1 Psychopathic personality
2	Delinquency	2 Deferred
2	Placement (in foster home)	1 Psychopathic personality 1 Malnutrition
2	Maladjustment at school	1 Obsessional neurosis (blind) 1 Hysteria (blind)
2	Maladjustment at work	1 Anxiety neurosis 1 Tuberculosis (incipient)
1	Epilepsy	1 Epilepsy
1	Dependency	1 Physical handicap
1	Attempted suicide	1 Mental depression

pressed and cried easily. He had had ideas of suicide but they were not present at the time of the interview. He was able to explain the growth of his ideas psychologically and had insight into his condition. He says that his family of eight children have become unmanageable, are over-indulged, and that his wife is incompetent to manage them. He stated that he had been so agitated because of his wife's inefficiency and the general chaos in the home that

the fourth and fifth lumbar spines. His musculature was unusually good.

Recommendation was made that the patient be fitted to the proper support and that he return to work immediately in order to resolve his neurosis.

The man's wife was examined on a later date. She was born in Italy 39 years ago. Thirteen years ago she came to the United States. She never attended school in Italy, always worked in the fields, and can

neither read nor write. Physically, she has well-marked varicose veins of both legs with old ulcerations on each. She has had eight children in thirteen years and was pregnant at the time of the interview. On the psychological examination she did very poorly irrespective of the language factor, previous training, environment and physical condition. However, she was undoubtedly mentally defective.

It was recommended that she should have some assistance in the proper use of food and that her oldest daughter be given some stimulus to help her mother about the house, that the younger children be taken to a habit clinic so that help might be obtained in establishing a routine.

In summarizing, diagnostically, the husband had an anxiety depression conditioned by an industrial accident and aggravated by home conditions that he could not solve. His wife was defective mentally and did as much as could be expected with her mentality.

CHART III  
DIAGNOSIS

Physical	Mental
No.	No.
1 Congenital syphilis	<i>Functional</i>
1 Constitutional inferiority	3 Mental depression
1 Malnutrition	12 Neuroses
1 Physical handicap (blind and deaf)	8 Psychopathic personality
1 Syphilis	5 Schizophrenia (dementia praecox)
2 Tuberculosis	— 28
7	<i>Organic</i>
	1 Cerebrospinal syphilis
	2 Epilepsy
	1 Paralysis agitans
	1 Senile dementia
	9 Feeble-minded
	14 Normal
	3 Deferred
	— 31
7	59

A review of the charts shows that of sixty-six consecutive patients examined, twenty-two were males and forty-four were females. The ages ranged from three years of age to eighty years of age. Forty-five per cent. of the males were over twenty and sixty-three per cent. of the females were over twenty.

In the whole group there was only one patient who did not have a mental or nervous condition. This patient was a young girl with early tuberculosis, who was referred because she was having difficulty in continuing at work and unexplained fatigue.

Of the ten cases referred because of prolonged unemployment, there was a definite condition making total adjustment to work impossible. However, in three of the cases complicated by industrial accident, earlier return to work was recommended in order to resolve the neurosis. One case, in particular, in this group had had difficulty in adjusting to her co-workers for over three years, and for nearly a year had been unable to obtain permanent employment. This woman had a beginning paralysis agitans.

Although out of the total group of sixty-six only five cases were referred because of suspected mental disease there were eleven cases of frank psychoses. Of five patients referred because of peculiar behaviour, two had well developed schizophrenia.

Of the whole group, twenty-four were married and forty-two were single. Although but five patients were referred because of marital maladjustments, this condition was an important factor in seventeen of the twenty-four married patients. The mental maladjustments of the parents was the chief factor in the lives of thirteen of the forty-two unmarried patients.

## A COMPARISON OF THE ANTIRACHITIC POTENCY OF IRRADIATED COD LIVER OILS

BY EDWIN T. WYMAN, M.D., ARTHUR D. HOLMES, PH.D., LAWRENCE W. SMITH, M.D., DONALD C. STOCKBARGER, SC.D., AND MADELEINE G. PIGOTT

It has been repeatedly shown that cod liver oil has the highest fat-soluble vitamin content of any naturally occurring substance. Furthermore, it has been demonstrated by a number of investigators that some types of edible oil and certain other substances when subjected to irradiation by ultra-violet light acquire definite antirachitic value. From these two observations, the question naturally arises as to whether the antirachitic potency of cod liver oil may be enhanced by subjecting it to the action of ultra-violet light. It was for the purpose of securing information on this point that the present investigation was undertaken.

### Nature of Oil Studied

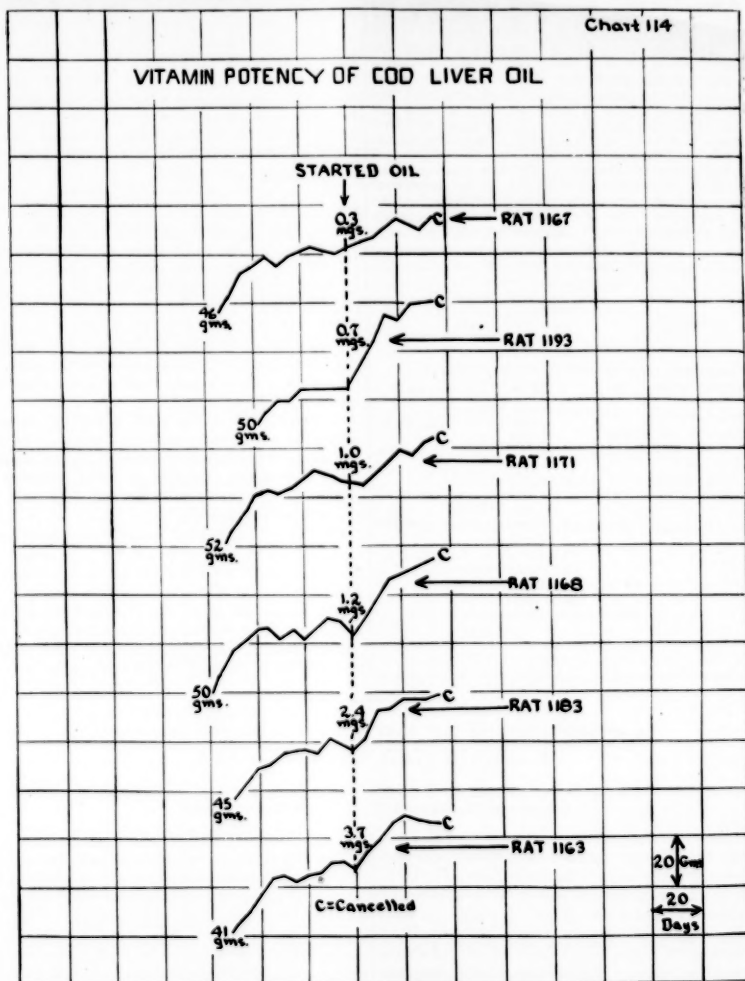
The cod liver oil which was used in the test discussed below was an American, medicinal cod liver oil. It was manufactured from fresh livers by the open kettle steam process. This oil, which was obtained from two sources, Nova Scotia 19% and Gloucester 81%, was blended before cold pressing. Its chemical and physical characteristics were determined by the usual analytical method<sup>1</sup> with the following results:

### CHEMICAL AND PHYSICAL CHARACTERISTICS

Sp. Gr. at 25°C	Ref. Ind. at 20°C	Sapon. value	Iodine number	F. F. A. percent
0.9214	1.4790	193.3	163.2	0.6059

The Vitamin A potency of the oil under consideration was determined by the method<sup>2</sup> which has already been described in detail.

in its natural condition, and hereafter will be referred to as non-irradiated oil. The other three lots were subjected to irradiation by a Cooper



The results of this test are reported in chart No. 114, which show that this oil was rich in vitamin A.

#### *Irradiation of Oil*

A supply of the above described cod liver oil was divided in four lots. One lot was reserved

Hewitt BY quartz mercury lamp for periods of one half hour, one hour, and two hours respectively. This lamp was practically new, having been previously used about 50 hours. It was operated at 4 amperes and 85 volts across the arc.

100 CC of cod liver oil were irradiated at a

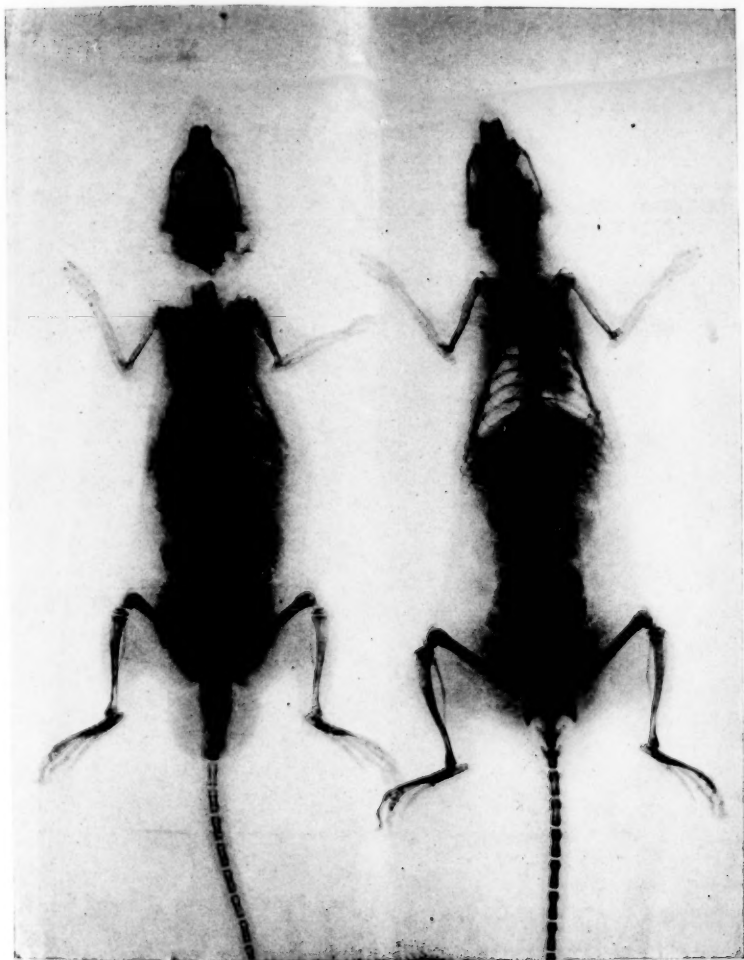


PLATE NO. 1. Rats No. 1165 and 1254. Stock Diet.

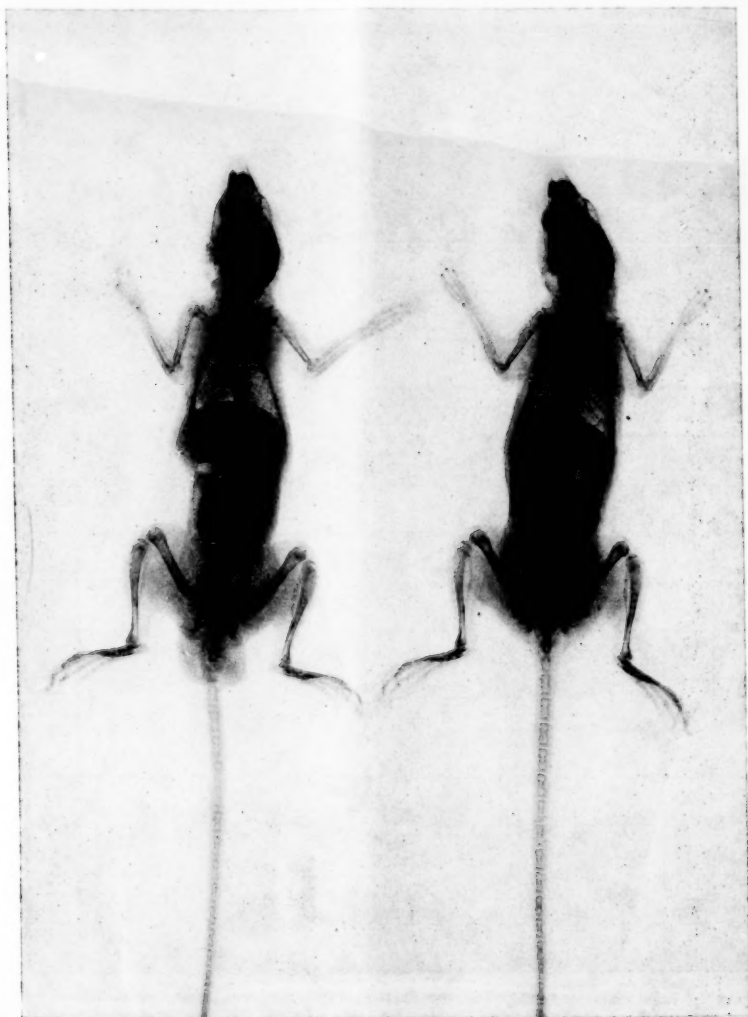


PLATE NO. 2. Rats No. 1222 and 1223. Vitamin A-Deficient Diet.

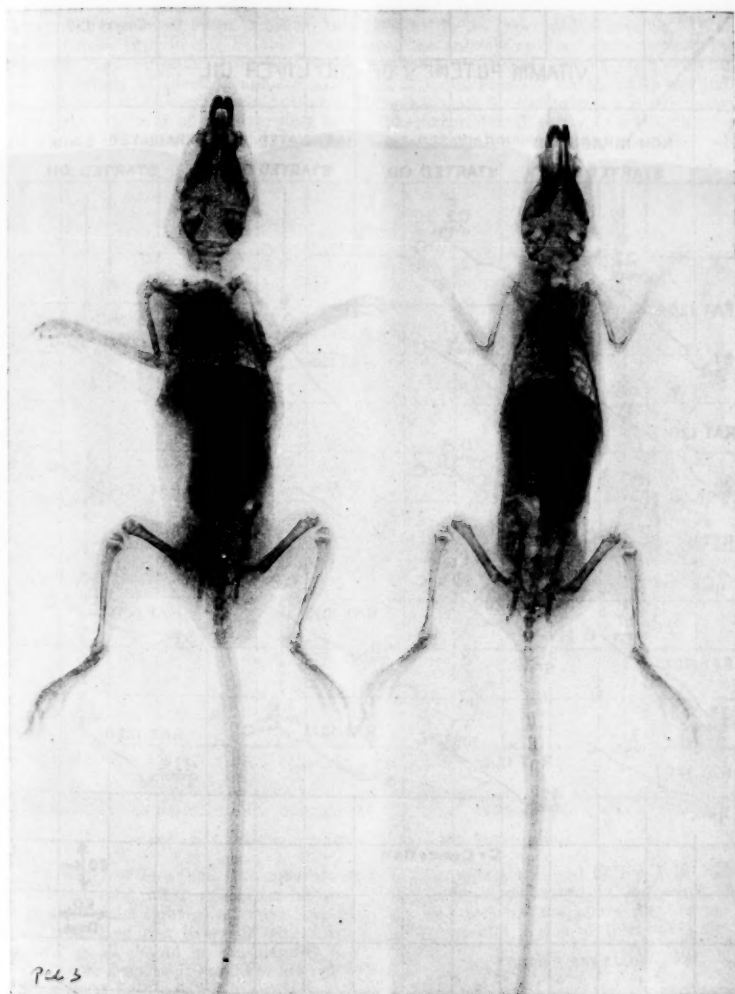
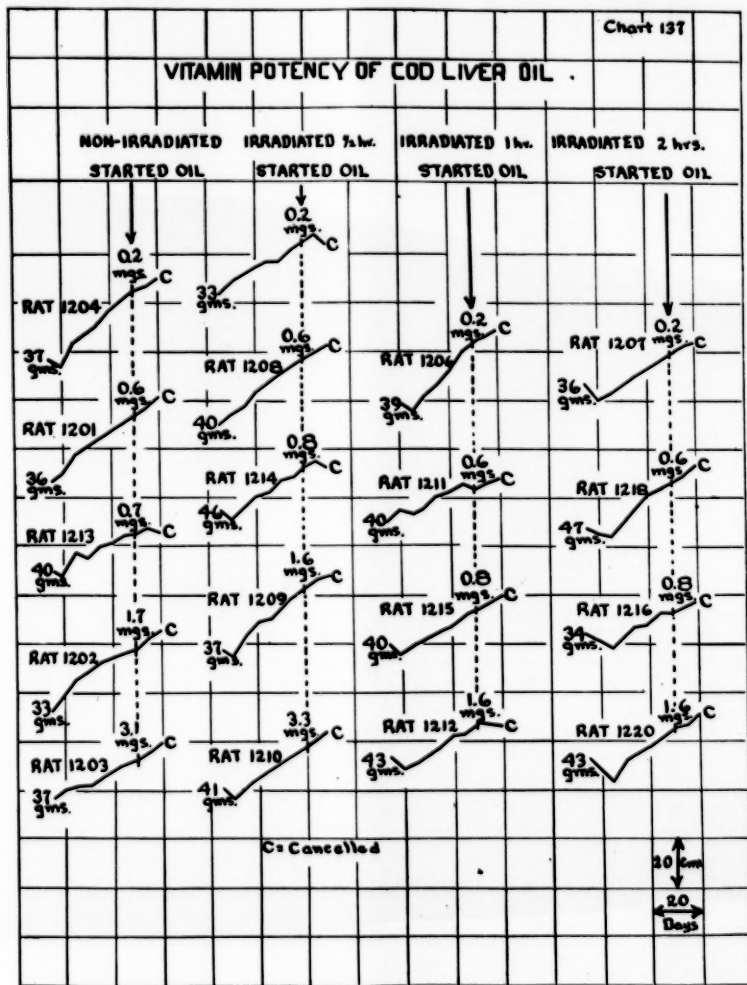


PLATE NO. 3. Rate No. 1219 and 1220. Rickets Producing Diet

time in an eight-inch, flat bottomed, crystallizing dish. The oil was maintained at a constant temperature of 25°C during the period of irradiation by placing the crystallizing dish in a con-

verted T-shaped stirring rod. The combined lengths of the blades of the stirring rod practically equalled the diameter of the crystallizing dish. To prevent a shadow being cast on the



stant level, circulating water bath. The depth of the oil was just sufficient to submerge a glass stirring rod of 4 millimeters diameter. In order that a fresh surface of oil should be constantly exposed to the action of the ultra-violet radiation, the oil was continually stirred with an in-

oil by the stirring mechanism, the lamp was placed a little to one side of the axis of the dish. The distance of the lamp from the plane of the oil was 11 inches while the distance from the center of the oil surface was 12 inches. The stirring rod was driven by a small electric motor

at a uniform rate of 100 revolutions per minute, which speed was just under that which would cause whipping and consequent spattering of the oil. This method of constantly bringing the fresh surface of oil in contact with the ultra-violet radiation was adopted by us in order that we might in future experiments be able to exactly duplicate our irradiation procedure. Furthermore, the results of spectrographic studies show that cod liver oil is very nearly opaque to ultra-violet light. A layer of cod liver oil a few hundredths of one millimeter thick absorbs ultra-

Patent Flour	95.0%
Calcium lactate	2.9%
Sodium chloride	2.0%
Iron citrate	0.1%

This diet and distilled water was constantly available to the experimental animals. In addition, the animals received daily a yeast tablet consisting of fifty milligrams yeast concentrate and fifty milligrams of starch, which was judged to be adequate for their vitamin B requirements.

The experimental animals used in this investigation were twenty recently weaned albino

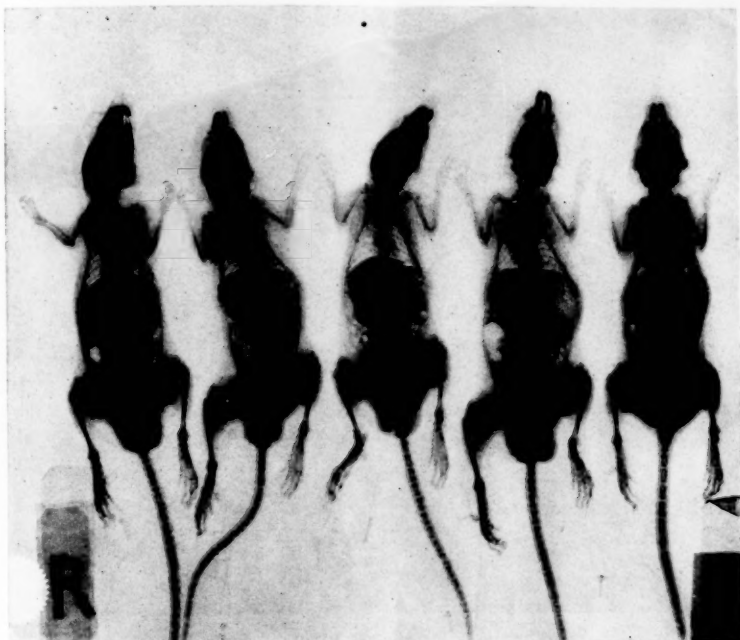


PLATE NO. 4. Rats No. 1204, 1201, 1213, 1202, 1203. Non-irradiated.

violet light waves of less than 0.26 microns in length and cod liver oil 1 millimeter deep is opaque to ultra-violet light of all wave lengths. Thus, in irradiating cod liver oil with ultra-violet light, the oil should be considerably less than 1 millimeter deep, or it should be stirred to insure ultra-violet light coming in contact with oil that would otherwise remain too far below the surface.

#### Nature of Diet and Laboratory Procedure

Recently weaned, albino rats were placed on a synthetic diet (Sherman-Pappenheimer) consisting of:

rats that were purchased of the Wistar Institute. They were housed in individual metal cages and received the above diet during the pre-experimental period of thirty-five days.

#### CONTROL ANIMALS

At the termination of the pre-experimental period two animals, Nos. 1219 and 1220, were removed for clinical observation. These animals were bled, x-rayed, and submitted for pathological examination. For the sake of further comparison, we also examined in the same manner four animals of approximately the same age. Two, Nos. 1165 and 1254, had been fed a stock

diet, and two Nos. 1222 and 1223, had received the Vitamin A deficient diet for one month.

Judging by the physical condition, the stock animals were apparently normal; the rats on the Vitamin A deficient diet were somewhat subnormal and the rats on the rachitic diet were decidedly sub-normal.

#### Blood Examination

The blood of the six animals used for control purposes was reserved for analysis. The blood

From the results reported in this table, we conclude that the animals Nos. 1219 and 1220, which had been maintained on the low phosphorus diet were suffering from rickets induced by an inadequate supply of phosphorus.

#### X-Ray Examination

To secure further evidence concerning the skeletal condition of the control animals, radiographs were made of the three groups of control animals.

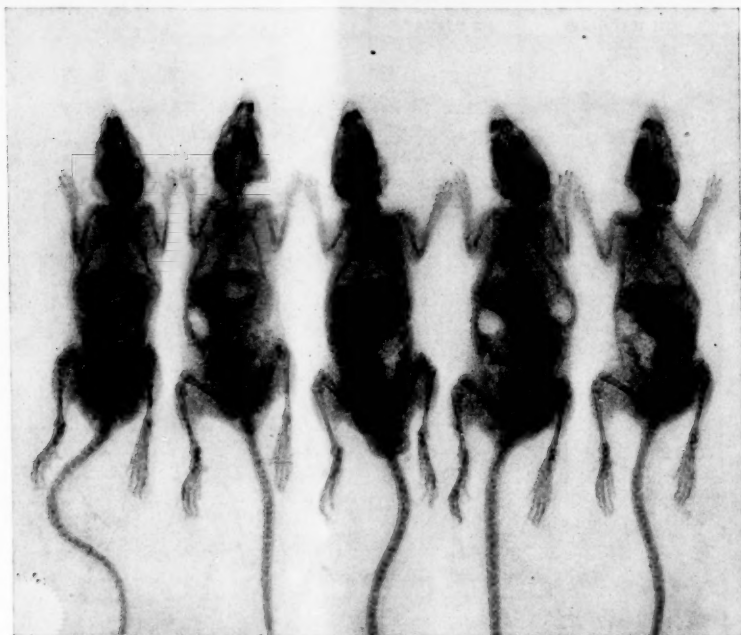


PLATE NO. 5. Rats No. 1205, 1208, 1214, 1209, 1210. Irradiated  $\frac{1}{2}$  hour.

calcium<sup>4</sup> and inorganic phosphorous<sup>5</sup> was determined for the first two groups, but the amount of blood obtained from the rachitic animals was insufficient for more than the phosphorus determination.

#### CALCIUM AND PHOSPHORUS CONTENT OF BLOOD FROM CONTROL ANIMALS

Rat No.	Kind of Diet	Ca	P
		Mg. per 100 CC	Mg. per 100 CC
1165	Stock	13.0	6.8
1254			
1222	Vitamin A Deficient	6.66	6.3
1223			
1219	Rickets Producing	—	3.65
1220			

Referring to Plates 1, 2, and 3, it will be noted that the skeletal development of rats Nos. 1219 and 1220 is not to be compared with that of rats Nos. 1165 and 1254, and Nos. 1222 and 1223, which received the stock and Vitamin A deficient diets respectively.

Thus from the evidence concerning the physical condition, the composition of blood, and that exhibited by the radiographs, it is evident that the animals that had been fed the low phosphorus diet were suffering from rickets. We assumed that the same condition existed in the case of the remaining eighteen animals that had been confined to the low phosphorus diet.

#### EXPERIMENTAL ANIMALS

The eighteen animals were continued for ten days on the diet referred to above, supplemented by quantities of oil varying from 0.2 to 3.3 milligrams daily. The change in the body weight of these animals during both the pre-experimental and experimental periods is reported in the accompanying chart (No. 137).

base definite conclusions. However, from the evidence at hand concerning effect on growth, it appears that the antirachitic value of cod liver oil was little, if any, enhanced by irradiating with ultra-violet light.

#### Blood Examination

Due to the insufficient amount of blood obtain-

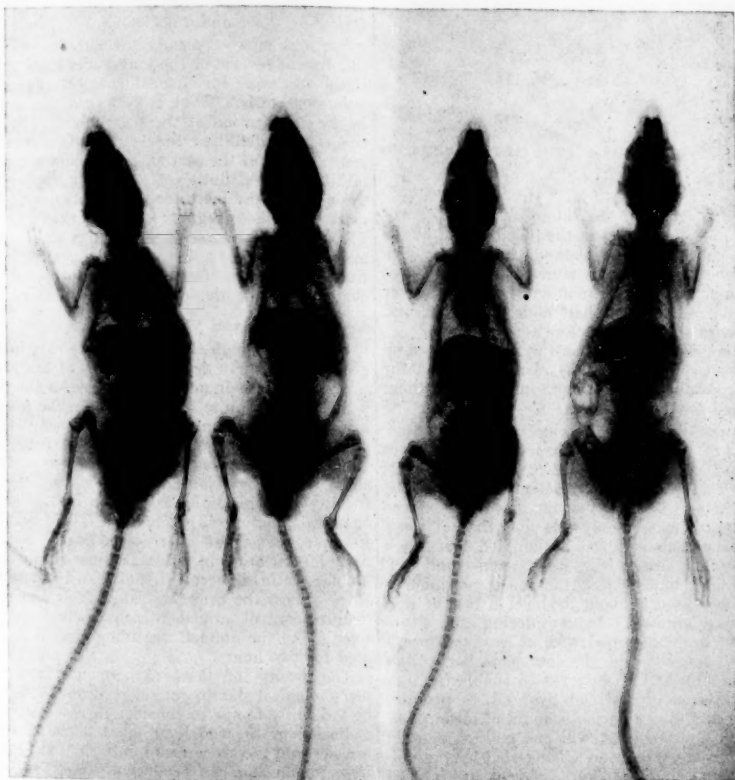


PLATE NO. 6. Rats No. 1206, 1211, 1215, 1212. Irradiated 1 hour.

On comparing the growth curves reported above, it is found that for the experimental period there is little, if any, difference in the growth of the animals receiving non-irradiated cod liver oil and cod liver oils irradiated one half hour, one hour, and two hours respectively. It is recognized that the experimental period of ten days is probably much too short to obtain sufficient data concerning growth on which to

able from an individual animal, it was necessary to pool the blood of the animals comprising the different groups. However, since the animals of the different groups received approximately the same amount of oil, the composite blood samples should give information concerning any qualitative difference in the antirachitic value of the four oils under consideration. The results of the analyses follow:

## CALCIUM AND PHOSPHORUS CONTENT OF BLOOD SERUM

Rats No.	Kind of oil	Ca	P
		Mg. per 100 CC	Mg. per 100 CC
1204	Non- irradiated	10.3	3.88
1201			
1213			
1202			
1203			
1205	Irradiated $\frac{1}{2}$ hr.	12.0	3.63
1208			
1214			
1209			
1210			
1206	Irradiated 1 hr.	13.8	3.86
1211			
1215			
1212			
1207	Irradiated 2 hrs.	12.6	3.54
1218			
1216			
1220			

A comparison of the values obtained for calcium and phosphorus in the blood serum of the experimental animals showed that, in general, the amount of these constituents in the blood of the animals receiving non-irradiated cod liver oil, oil irradiated one half hour, one hour, and two hours are in fairly close agreement.

Inasmuch as these animals were maintained on a low phosphorus diet, the results obtained for blood phosphorus are of more interest than those obtained for blood calcium.

Comparing the results obtained for the four groups of experimental animals with the figures obtained for blood phosphorus of the animals on stock and Vitamin A deficient diets, it will be noted in each instance that the blood phosphorus was approximately only one half that of these control animals. It was anticipated that when cod liver oil, either irradiated or non-irradiated, was added to the diet, the blood phosphorus would be raised to about the level of that of well nourished animals. In considering this situation, we are confronted with at least two possibilities; namely, did the low phosphorus diet contain sufficient phosphorus to enable the animals, even when fed cod liver oil, to produce blood containing a normal amount of blood phosphorus; and secondly, will one milligram daily (the average amount of oil ingested by the animals composing the four different groups) of any cod liver oil contain sufficient antirachitic activity to effect a satisfactory mineral metabolism in rachitic animals?

However, regardless of the explanation in this connection, it appears from the results of the blood examination that little, if any, difference in antirachitic activity existed between the four oils under consideration.

*X-Ray Examination*

For convenience in comparing the radiographs of the different experimental animals, the ani-

mals were arranged in the order of increasing amounts of oil. Plates Nos. 4, 5, 6 and 7 show the animals composing the groups fed non-irradiated oil, cod liver oil irradiated one half hour, one hour, and two hours. Comparing plates Nos. 4, 5, 6, and 7 one finds little if any difference between the amount of healing that has occurred in the animals that received non-irradiated oil, oil irradiated one half hour, one hour, and two hours.

*Pathological Examination**Rats Nos. 1204 and 1203*

Sections microscopically through the epiphyseal line of several of the long bones show essentially the same histological changes characteristic of rachitis. There is a marked diminution in the calcification of the trabeculae. The cartilage shows definite irregularities in its arrangement. Some of the cartilage cells show a typical nesting and a definite compensatory hyperplasia to overcome the bony trabecular atrophy. The marrow in these regions shows marked fibrosis. These changes are not as striking as seen in animals kept on such a diet over a longer period of time, but are perfectly representative of the changes seen in dietary deficiency in rats.

*Rats Nos. 1218 and 1220*

Sections through the bones of the rats in this group show fairly definite changes of the rachitic type. These do not appear to be for the most part, however, quite so marked as in the preceding series. The bony trabecular atrophy is less striking. The irregularity of the cartilaginous junctions is less prominent. The degree of fibrosis of the marrow is relatively less, and the deformity of the epiphyseal region or the costochondral junctions is less marked. These changes, however, are only of microscopic degree, and individual variation in different bones in the same animals or in different animals can be found to cover almost the complete range from the more definite control animals which received no cod liver oil to the animals receiving the oil irradiated for two hours.

The results of these experiments from the morphological standpoint suggest that there may be a definite factor to consider in respect to the radiation of the cod liver oil, but the changes are so slight in this series of animals that no positive conclusions can be drawn. They are sufficiently marked, however, to suggest that it would be worth repeating such a series of experiments over longer periods of time and possibly with larger quantities of the antirachitic factor.

## SUMMARY

A medicinal cod liver oil of known origin, chemical and physical characteristics, and vitamin A potency was irradiated under carefully controlled conditions for periods of one half, one, and two hours. The antirachitic potency of

the original oil and the three lots of irradiated oils was studied to determine to what extent the antirachitic activity of the original oil was enhanced by irradiation with ultra-violet light.

Albino rats were used as the experimental animal. The anti-rachitic potency of the oils under consideration was judged by growth curves, blood calcium and phosphorus, radio-

be enhanced by irradiation with ultra-violet light. For it is possible that the amount of irradiation which the oil received by the irradiation procedure described may have been insufficient to produce distinguishable differences in its antirachitic activity or the amount of the oils fed may have been insufficient to produce detectable differences in the experimental animals. It



PLATE NO. 7. Rats No. 1207, 1215, 1216, 1220. Irradiated 2 hours.

graphs, and pathological examination. Considered either individually or collectively the results obtained indicate that there was little if any difference in the antirachitic potency of the original oil and that which had been irradiated one half, one or two hours.

The results obtained in this preliminary study are not extensive enough to show definitely that the antirachitic potency of cod liver oil cannot

is expected that further evidence on these questions will form the subject of a later paper.

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A CASE OF INFECTION WITH *ASPERGILLUS VERSICOLOR*\*

BY ALBERT E. STEELE, M.D.

*ASPERGILLUS* infections have been reported in medical literature since 1842 by many writers. Most of the cases have been reported by French and German workers.

The impression that one receives from a study of the literature is that the organisms, in the majority of instances, were remotely associated with the disease.

A few facts are, however, well established—that some of the *Aspergilli* are pathogenic for man—that they have been seen in the sections of the lung—and that animal inoculation has produced definite lesions.

Koch's laws have been fulfilled in the case of the *Aspergillus Fumigatus*. This organism produces a disease of the lung which is common among pigeon crammers about Paris. Much pathological, bacteriological and serological work has been done with this *Aspergillus* by French observers. Infection with it appears to be uncommon in this country.

*Aspergillus bronchialis* is an organism which was found post-mortem growing in the bronchial tree of a diabetic. The author, Professor Chiari, believed it to be pathogenic. No pathologic lesions which were due to it have been demonstrated since.

*Aspergillus Piotor* is believed by some to be the cause of Pinta, a skin disease of Central America. It is commonly associated with the disease but no other facts have as yet been demonstrated.

*Aspergillus Nidulans* is believed by some to be the cause of some cases of Mycetoma and possibly Otomycosis. It has been found in numerous cases of the former in smear preparation. Many other *Aspergilli* have been described and named but none have been proven to be the cause of human disease.

Among these is *Aspergillus Versicolor*, an organism which was found in sputum by Moisky in 1903 and which is closely related to *Aspergillus Nidulans*. Moisky states that it is "not usually a parasite" and is "non-pathogenic".

Careful search of the literature has failed to reveal any further mention of this organism.

The study which I am about to report indicates that the organism was pathogenic in this case. While definite proof is lacking, the author believes that its presence in smears of pus from the abscesses of the chest wall, unaccompanied by other organisms and its growth in pure culture are strong evidence that it was the etiologic agent. The negative experimental evidence is probably due to the fact that the lower animals are not susceptible to infection with this organism. The chronicity of the dis-

ease is in harmony with that of other *Aspergillus* infections; and the histological reactions of the tissues are similar to those which are due to other organisms of this group.

F. C., 57 years old, white, male, carpenter, entered the Massachusetts General Hospital, West Medical Service, on April 27, 1923, and was discharged May 24, 1923.

The previous history was that "some skin trouble" had been present since he was 19 years of age. Dry papules appeared on the hands, became scaly and itched. These gradually spread all over the body. After some years these lesions improved and he has few such lesions now. He has had dry, thick nails with swelling of the skin about their base for several years. About four years ago he noticed a swelling in the left axilla which was painful. In two months it became as large as an egg, opened spontaneously and discharged a large amount of purulent material. Two months ago a painless swelling commenced on the left chest, which recently opened. Three months ago a similar swelling was incised in a hospital. There has been much cough and sputum for the past six months.

On physical examination, the skin of the forehead showed numerous discrete papules from 1 mm. to 1 cm. in diameter, scattered irregularly about the scalp; an indurated lesion 5 to 6 cm. long over the right forehead which is purplish red in color. The skin over the entire body is dry. In the left axilla there is a desquamating area about 4 cm. in diameter. The patient also has desquamating areas over both buttocks, back of thighs and left neck. In the left neck there is a sinus which discharges a thin, sero-purulent material. At the left side of the sternum there are three discharging sinuses. The whole anterior left chest is red and indurated. The cervical and inguinal lymph nodes are enlarged.

The left chest shows relative dullness over the upper half and sonorous rales over this area. There are a few sonorous rales over the apex of the right lung. Otherwise nothing remarkable is noted.

The X-ray report states that the left chest shows density which is most marked in the mid-portion and extends out fan-like from the hilus. This is fairly even except near the root where the usual linear markings are visible. Its borders are indistinct. It apparently reaches from the hilus to the chest wall. The intercostal spaces on this side are narrowed; the heart and mediastinal contents are not displaced. The diaphragm is high on the left and the respiratory movements are somewhat limited. The right lung is clear with the exception of enlarged glands at the roots. The process in the left chest probably involves the lung and pleura. The appearance is not that of tuberculosis.

A small piece of tissue was removed from the axilla on May 23.

Pathological report by Dr. H. F. Hartwell states: "Microscopic examination of a small fragment shows a chronic inflammatory process with epithelioid, giant and plasma cells. There is no evidence of tuberculosis. No micro-organisms can be found."

Both the sputum and the pus from the abscesses of the chest wall showed structures which were regarded as filaments of a mould fungus. These appeared as hyphae with doubly contoured walls, septa and granular contents. The length and breadth varied considerably, as is shown in the smear of the sputum and the smear of the pus from the abscess

\*From the Pathological Laboratory, Massachusetts General Hospital.

of the chest wall. The latter smear shows that the hyphae are embraced by giant cells.

Several cultures of the pus from the abscess of the

growth of white colonies. The tubes which were incubated at 37.5° C. did not show any growth. From the former, transplants were made on all of the above media. Colonies grew readily at room temperature. At 37.5° C. there was only a slight increase in the size of the colonies.



FIGURE 1

chest wall were made on blood serum, plain agar, potato, Saboraud's maltose, glucose and peptone. Some were incubated at room temperature and others

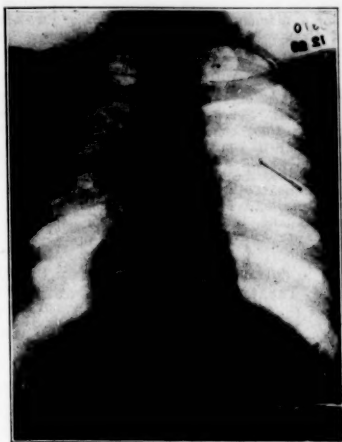


FIGURE 2

The colonies which grew on potato and on maltose were large, white and elevated, with a thread-like



FIGURE 3

at body temperature. After ten days the tubes of potato and those of Saboraud's maltose which were incubated at room temperature showed a slight



FIGURE 4

border. The edges were raised and the center was slightly depressed. There were also slight depressions which radiated from the center something like the spokes of a wheel. The growth adhered tena-

closely to the media and the under surface was yellowish-brown.

Smears from these cultures showed in an unstained state a tangled mass of branching filaments which varied considerably in size. The filaments often showed septate granular contents and doubly contoured walls. If allowed to grow two weeks or longer, the colonies showed conidia formation at the end of a filament; this end was an ovoid enlargement about which the spores were clustered. (See Figure 4.)

#### ANIMAL INOCULATION

Two guinea pigs were inoculated with pus from the abscesses. Necropsy showed no evidence of tuberculosis or of any other infection. Several mice were inoculated with pus but showed no lesions.

One guinea pig was inoculated with material from a culture into the subcutaneous tissue, one pig into the peritoneal cavity and one into the heart. No lesions resulted. Four mice were also used for subcutaneous and intraperitoneal inoculation, but no lesions were seen at necropsy.

Classification of the organism which was grown in culture was made for me by Professor Roland Thaxter of Harvard University, who believes that it is a variety of *Aspergillus versicolor*. The author wishes to express his thanks for this aid.

*Aspergilli* are organisms which belong to the Fungi—some of which are parasitic. Fungi are subdivided into Myxomycetes, Phycomycetes, Ascomycetes, Basidiomycetes and Hypomycetes or Fungi Imperfecti. *Aspergilli* belong to the Ascomycetes and are separated from others of this group by the fact that they have a compact peridium and small sessile perithecia. *Aspergilli* can also be recognized by the fact that the spores are unicellular, that the conidiophores are enlarged apically and bear sterigmata. Organisms whose sterigmata are simple are called *Aspergilli*; those with branched sterigmata are called *Sterigmatocystis*.

The species classification was made from the color production of the organism on culture media.

It may thus be seen by a study of the smears that we were dealing with a branching filamentous rod with septae, doubly contoured wall and granular contents. Cultures of the pus were made and pure cultures appeared on maltose and on potato. Smear from these colonies showed a tangled mass of branching septate fila-

ments, whose contents were granular; after two weeks, the conidiophore enlargement and spore formation was noted. Thus the organism in smear and in culture have similar appearances and are believed by the author to be identical.

While it is possible that this fungus was merely a secondary invader of the lesions, it seems more logical to believe that it was the cause of them for the following reasons:

1. Its occurrence unaccompanied by other organisms in the abscess which had not been opened.
2. The fact that it was embraced by multinucleated giant cells, which indicated reaction on the part of the tissues to it.
3. The fact that the histological examination of the axillary tissue showed chronic inflammation without evidence of tuberculosis or syphilis.

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## THE EFFICACY OF VACCINATION AGAINST SMALLPOX\*

### A Recent Experience

BY CLARENCE L. SCAMMAN, M.D. AND OSCAR A. DUDLEY, M.D.

MASSACHUSETTS, ever since the early years of the nineteenth century, has been a contributor of abundant and convincing evidence of the value of vaccination against smallpox. A recent experience within its boundaries is so singularly complete in its details that a description of its circumstances seems desirable.

\*From the Massachusetts Department of Public Health.

On April 1st, 1926, seven people left Orlando, Florida, en route by automobile to Upton, Massachusetts. They reached Upton on Saturday, April 10th, and upon their arrival three of the seven were ill. Dr. Samuel R. Capen of Upton was called and made a diagnosis of smallpox, which was confirmed by Dr. Francis M. Lally of Milford and Dr. Oscar A. Dudley, State Dis-

trict Health Officer. A fourth person in the group was found convalescent from smallpox. This case had its eruption in Orlando about March 13th. The whole group had been exposed in Orlando to a case of smallpox (then unrecognized) in the household with them.

Of the seven persons making this trip (all of whom had been definitely exposed to smallpox) the four who took the disease had never been previously successfully vaccinated. The age and sex of the patients were as follows: two males age 49 and 22 years, respectively, and two females aged 48 years and 15 months, respectively. The age, sex and vaccination history of the others of the group who, though exposed, did not contract the disease were as follows: female 18 years old, vaccinated at five years, showing scar; female 73 years, vaccinated at nine, showing faint scar; male 9 years, vaccinated at five and showing scar. This group of three was re-vaccinated and all showed (including the individual vaccinated sixty-four years before) typical reactions of immunity.

This set of circumstances affords several interesting and significant observations. They show that we lack barriers against the introduction of smallpox into the state. With the disease prevalent in Florida and California it is possible for individuals to receive their infec-

tion in such distant states, and travelling by automobile, to arrive in Massachusetts suffering from the disease or even before the symptoms have appeared.

On the other hand, we do possess barriers to the spread of the disease, once it is introduced. Upton is a well vaccinated community, the compulsory vaccination law being thoroughly enforced there. For the individual, vaccination is the one sure means of protection against smallpox, even though the exposure be intimate and prolonged. This is shown by the fact that of the seven persons exposed, the four who had never been successfully vaccinated contracted the disease, while the three who had been at some time successfully vaccinated, although in close contact with these four smallpox cases, entirely escaped infection. That fate, personal hygiene, or whatever you please, played no part in their escape seems clear on the evidence supplied by the immunity reactions shown by these four previously vaccinated members of the party. That one successful vaccination performed sixty-four years previously may produce such a lasting immunity is most unusual, but in this case at least is a fact, as proved by the reaction of immunity shown by this person when vaccinated after exposure and by her complete freedom from infection.

## The Massachusetts Medical Society

### THE CONTROL OF THE COMMUNICABLE DISEASES PREVALENT IN MASSACHUSETTS\*

With a Study of the Mortality Due to Them During the Past  
Seventy-Five Years

BY EDWARD G. HUBER, M.D.

(Continued from Page 484)

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#### 7. SCARLET FEVER

Scarlet fever is in many respects one of the most important of the communicable diseases. Probably there is no other disease which has had so many and such widely varying control measures applied to it in the various states and municipalities, in modern times at least. And yet, no matter what has been attempted, the results have been practically the same every-

\*Published by the Committee on Public Health of the Massachusetts Medical Society.

where. Isolation has been practiced for the past thirty years, and although the mortality of the disease is less, this may be due entirely to lessened virulence. The few reliable morbidity data seem not to indicate any perceptible decrease in the incidence of the disease. The mortality rate from it has gradually decreased to such an extent that it is evident that the character of the disease has changed in the last half century. Yet the treatment is the same, and the specific cause has not yet been definitely determined. When we take note of the prevalence of the disease and its effect on school attendance and school health work, it is difficult to discover any compensating result in actual control to pay for the time and money expended in control measures and for the inconveniences of the exasperatingly long periods of isolation.

It is very probable that the present time is

the transition period from one of ignorance to one of scientific control such as is now possible in diphtheria. It therefore seems useless to spend much time in discussing present efforts at control, and on the other hand, the new methods although very likely to be correct are not yet on a sufficiently firm basis to be fully adopted and advocated. Until the new data are completely accepted it will not be wise to urge them on the public. There is as yet no certainty that we know much more about scarlet fever than we did seventy-five years ago. It has been known since 1896 that streptococci are almost invariably present in the throats of scarlet fever patients. In 1902 it was shown that these streptococci differ in agglutination reactions from ordinary wound and erysipelas streptococci. Recent work apparently narrows the field much more, but the work is not yet conclusive. The literature is voluminous and very probably the work done during 1924 will result in scientific control and treatment of scarlet fever. Tunnicliff, the Dicks, and Dochez have been the leaders in the work. Mortality in scarlet fever is chiefly in infants and if the age of incidence of the disease can merely be postponed until the child has a better chance to combat it, the rate will be much lower.

About two-thirds of the 42,290 deaths that have been reported in Massachusetts as due to scarlet fever have been at ages under 5. Table 9 shows the actual figures.

TABLE 9  
SCARLET FEVER, MASSACHUSETTS

1849-1922			
Total deaths, all ages	45,290		
Deaths under 5	29,372	66.2%	
Deaths 5-9	19,965	24.2%	
Deaths 10-14	2,201	4.9%	
Deaths all ages, males	22,465	49.6%	
Deaths all ages, females	22,794	50.4%	
1887-1922			
Total deaths, all ages	10,483		
Deaths under 1	587	5.6%	
Deaths 1-4	5,762	55.0%	
Deaths under 5	6,349	60.6%	

Figure 55 shows the decrease in proportionate mortality during the last seventy-five years in two age groups (under 5 and 5-9). It also shows that although table 9 indicates that most of the scarlet fever deaths have been at ages under 5 those in the next older group have always formed a considerably greater proportion of total deaths from all causes than those in the former group. Figure 56 shows that the proportionate mortality at age less than 1 has always been small, much less than the decreasing percentage at ages 1-4. The latter has therefore always been slightly higher than that for the entire under 5 group. Figures 3-6 show that

except in infants scarlet fever has had a proportionate mortality second to that of diphtheria, and that the decrease in the proportion has paralleled that in diphtheria but preceding it by about ten years.

In figure 57 the uniform decline in the scarlet fever mortality rate for all ages since 1875 is apparent. The cause for this trend is unknown. Certainly there were no successful specific control measures. In figure 58 this decline in mortality rates is seen to have been participated in to equal extent by the three age groups,—under 5, 5-9, and 10-14, the relative magnitude of the rates in the respective groups being in the order given. Figure 59 gives similar figures for ages under 1 and 1-4, and the same decline is noted.

The seasonal variations in mortality have been fairly uniform, the peaks occurring most frequently from December to March, occasionally as late as May. September is practically always the low month (fig. 60). During the last three quinquennia the curve has been much more regular, without any of the irregular fluctuations existing before that time.

None of the recent works on scarlet fever has changed the conception that the disease is transmitted by nasal and pharyngeal mucus, as are the other diseases of the respiratory group—so-called. In addition there are probably carriers, including the abortive and other missed or unrecognized cases as well as the very numerous frank cases never seen or recognized by a physician. The relation between such infections as septic sore throat and scarlet fever is not known. Transmission of scarlet fever may also be accomplished through milk infected by a carrier. This is of importance in unpasteurized milk only and is one of the chief arguments of those who advocate the pasteurization of even certified milk.

The most disputed point in the control measures now in use is the length of the period of isolation. This now varies from three to six weeks for the ordinary case. Four weeks would seem ample except where ear, nose, or throat symptoms persist. It is true that the longer this period, the less the number of return cases but when the isolation is for four weeks the excess of the number of return cases over that when the period is two weeks longer must be insignificant compared with the infections transmitted by even the concealed cases. And the greater the length of the quarantine period required, the greater the number of concealed cases. It therefore seems advantageous to decrease the period to a wise minimum.

Hospitalization of the severe cases is to be recommended, if it is true that there are two strains, one virulent and the other mild. The latter type might then be useful in conferring immunity against the former. Non-immune children should be excluded from school for a week

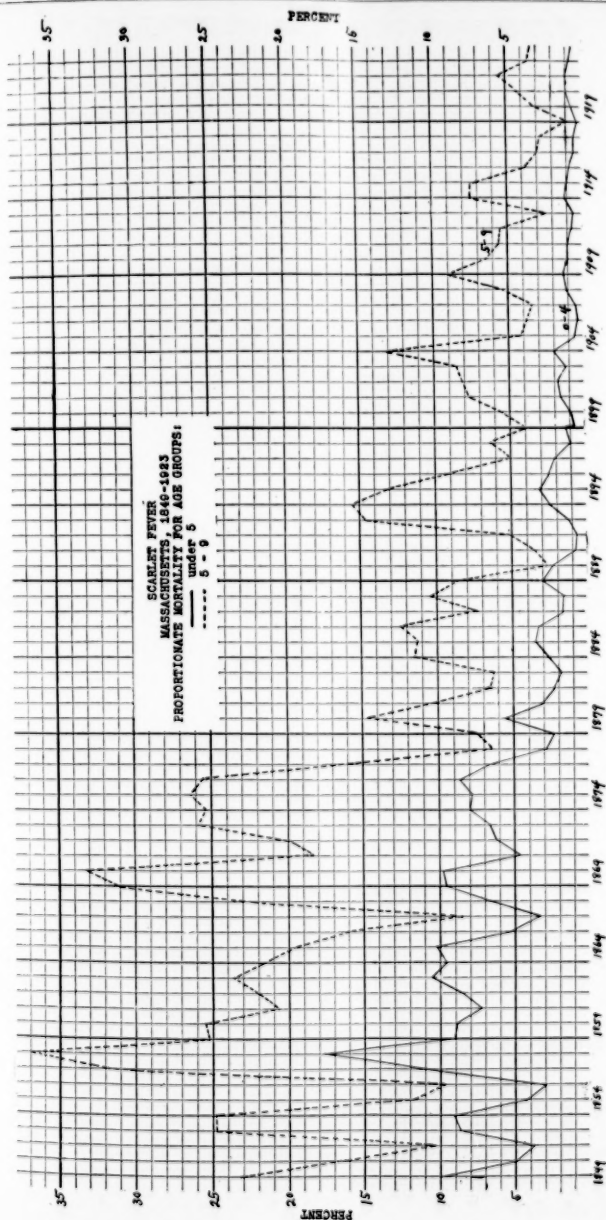


FIGURE 35

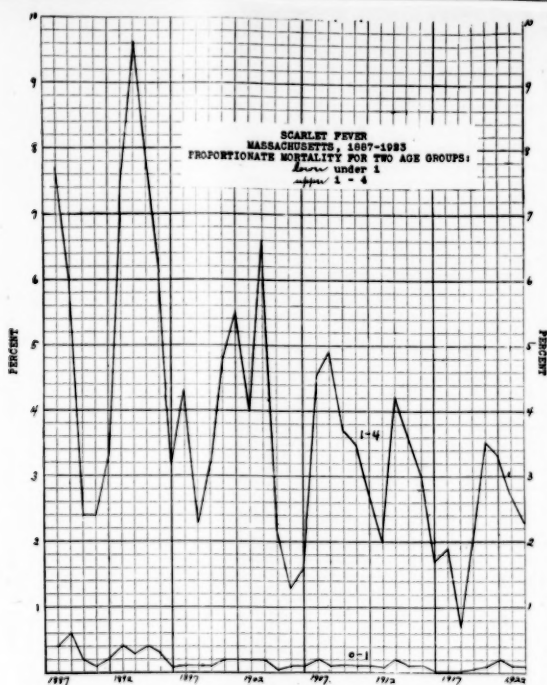


FIGURE 56

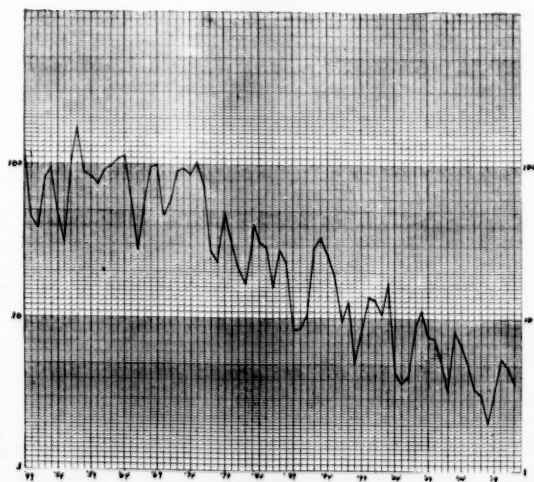


FIGURE 57  
SCARLET FEVER  
MASSACHUSETTS, 1849-1922  
Crude Mortality Rates per 100,000

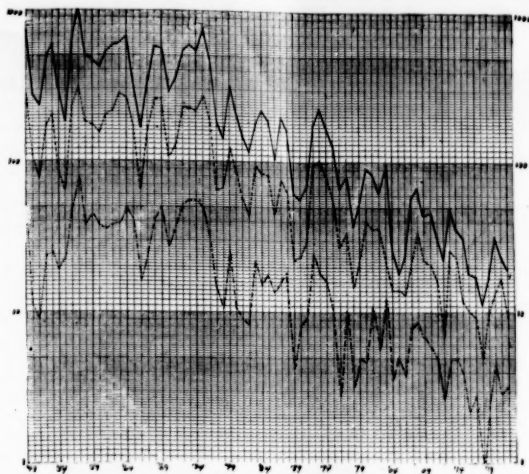


FIGURE 58  
SCARLET FEVER  
MASSACHUSETTS, 1849-1922  
Specific Age Mortality Rates per 100,000  
— age under 5  
- - - age 5-9  
- · - age 10-14

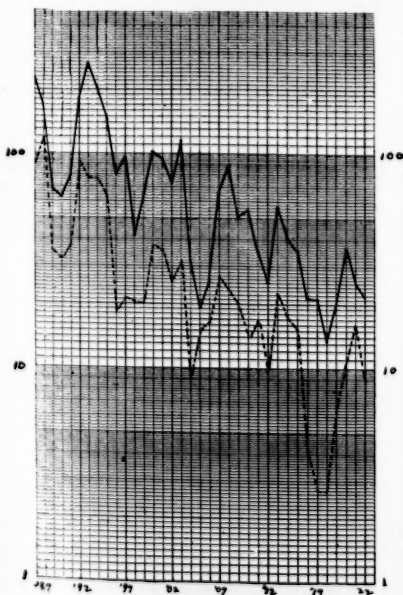


FIGURE 59  
SCARLET FEVER  
MASSACHUSETTS, 1887-1922  
Specific Age Mortality Rates per 100,000  
— age under 1  
- - - age 1-4

after the last exposure, although an immunity test which will be able to determine susceptibility now seems possible.

Inspection of school children daily, by the teacher, should be the rule in all schools. In the presence of an epidemic the particular prevailing disease will naturally be most carefully looked for. Children who are ill should of course be sent home and the health department notified.

Early diagnosis and notification by the attending physician are indispensable aids to the health department in its fight against the disease.

(To be continued)

See Figure 60 on next page.

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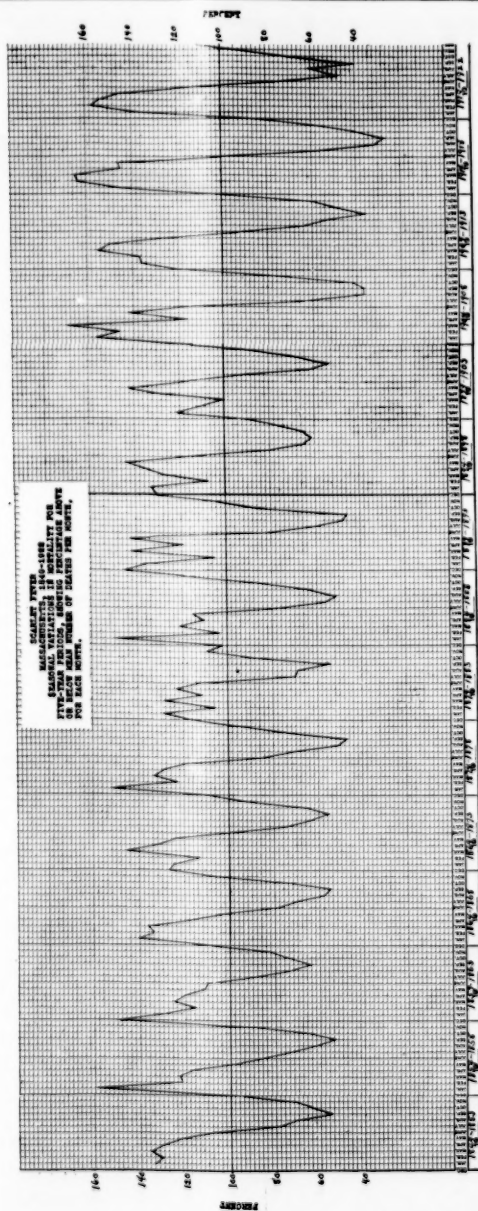


FIGURE 60

**Case Records**  
of the  
**Massachusetts General Hospital**

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN  
WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY

RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.  
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 12361

**CHRONIC AND ACUTE RESPIRATORY  
SYMPTOMS; CAUSE?**

**MEDICAL DEPARTMENT**

A married colored woman forty years old entered March 27 too ill to give a detailed history. She was somewhat disoriented as to dates. The complaint was pain in the upper anterior chest of four days' duration.

She had been working hard and feeling well until two weeks before admission, when she began to feel weak and easily tired. She had a "heavy cold" at that time with distressing productive cough throughout the night. The sputum was thick and yellow, amounting to two cupfuls at night. The cough and sputum persisted but did not become worse. Her chronic dyspnea, due to asthma, had been worse since the onset of the present illness. For a week she had been in bed. Four days before admission she began to have a "catching pain" in her upper front chest on breathing, and her abdomen became tender. For two days she had been raising bright red bloody sputum, about a cupful at a time, probably as much as a quart on the first day. For the past week or two she had had a temperature of  $101^{\circ}$  to  $102^{\circ}$ . She urinated twice at night.

Her father died of "shock" at fifty-two. She had never been strong and well, chiefly because of frequent asthmatic attacks all her life, with chronic cough. She had colds every winter. On rare occasions she had had tingling of the fingers. She was a highly temperamental woman. Before her marriage, twenty years ago, she weighed 140 pounds, her best weight. She did not know for how many years her weight had been 98-100.

Examination showed a poorly developed and nourished woman with hot, dry skin, obviously acutely ill. The examination was necessarily very scanty. There were carious teeth and pyorrhea. Percussion measurement of the heart was not attempted, or location of the apex impulse. Otherwise the heart was normal. The blood pressure was 100/65. There were many fine crackling rales over almost the entire left chest except the extreme base. There was dullness at the right base. Areas of bronchial breathing

were found at the right base anteriorly. The abdomen showed generalized tenderness and slight rigidity. Pelvic examination showed the left vault slightly indurated. The fundus was not felt. Rectal examination was negative. The pupils were normal. The knee-jerks were not obtained.

The urine was normal in amount, specific gravity not determined, a very slight trace of albumin at both of two examinations. A catheter specimen showed fifteen leucocytes per high power field; another specimen showed two red blood cells. Urine culture was negative. Blood examination showed 22,250 to 25,400 leucocytes, 89 to 93 per cent. polymorphonuclears, hemoglobin 60 to 70 per cent., 5,176,000 to 5,680,000 reds. Two smears were normal. A Wassermann was negative. Sputum: much blood at two examinations, blood-tinged at the third, no tubercle bacilli. Smith stain showed pneumococci and Gram-positive intracellular cocci, a few in short chains, capsules not made out, although one of two examinations showed also Gram-positive streptococci and small Gram-negative bacilli, intra- and extra-cellular. A blood culture showed pneumococcus.

X-ray showed moderate dullness at the left apex extending as low as the angle of the scapula, also some mottling at the right apex. The lower half of the right chest was dull. The dullness was of fairly even density throughout and occupied the region of the middle and lower lobes.

The patient ran a high steady fever,  $102.3^{\circ}$  to  $104.4^{\circ}$ ; pulse 105 to 140, respirations 14 to 35.

She was ordered absolute rest with opiates every morning and nitroglycerine for severe hemoptysis. The abdomen continued to be quite tender. March 31 she became much weaker and died.

**DISCUSSION**

BY RICHARD C. CABOT, M.D.

**NOTES ON THE HISTORY**

At entrance it sounds like pneumonia. Two weeks ago I suppose it was bronchitis. But if the history of the present illness is right it could not possibly be pneumonia. It might be tuberculosis.

A PHYSICIAN: Could it be aneurysm?

DR. CABOT: I do not think it could be aneurysm, because it would not give this amount of trouble without causing something else. It might be abscess of the lung. It might be malignant disease of the lung.

**NOTES ON THE PHYSICAL EXAMINATION**

The apex of the lung is involved.

So far as the physical examination alone goes I should say tuberculosis.

We have no evidence of trouble in the genito-urinary tract.

On the basis of the laboratory findings I should think aneurysm ought to be capable of being ruled out.

A PHYSICIAN: Would you have this blood in tuberculosis?

DR. CABOT: Yes. We rarely have any anemia in tuberculosis. I do not believe we know anything about what the sputum means.

We have to take the streptococcus culture seriously I think. We have to suppose that the man knew what he was about and that it was a real blood culture of pneumococcus.

The X-ray plate looks as if there was opacity at the left top and some at the right, and a lot at the right base. This is a queer distribution for pneumonia. It looks more like tuberculous disease.

#### DIFFERENTIAL DIAGNOSIS

This is a puzzling case. The most definite thing we have is the pneumococcus and the next is the X-ray. It seems to me the diagnosis lies practically between the suggestions of those two facts, together with the abdominal tenderness which we must not forget, and which might suggest pneumococcus peritonitis. Primary peritonitis, blood-borne, is not a very rare thing, and with pneumococcus in the blood we are bound to think of it. I never saw a pneumonic patient get rid of that amount of blood. But then we did not see it. Perhaps she did not. She had bloody sputum here, much blood at two examinations, blood-tinged at the third. Is there any statement as to the total amount of sputum?

MISS PAINTER: There is nothing.

DR. CABOT: We did not here observe any tremendous amount of blood. So as far as our observations go perhaps this was not any more blood than pneumonia might show. I do not know anything else to think of except pneumonia and tuberculosis.

A PHYSICIAN: Malignant disease?

DR. CABOT: I do not think it could be. In the first place I have never seen such a distribution of shadow as that in malignant disease. In the second place I do not think she could have died so soon, with so high a fever, with so much evidence of infection. Malignant disease of the lungs is a long affair and gives a different X-ray picture.

A PHYSICIAN: Could it be an endocarditis and pulmonary infarct? She had had asthma.

DR. CABOT: That is a thing I had forgotten. Had that chronic asthma any relation to her death? I do not think so. Aneurysm has been brought up. That is a disease I have seen diagnosed as asthma, from the wheezing which pressure by the aneurysm gives.

A PHYSICIAN: How about tuberculosis and pneumonia?

DR. CABOT: That is perfectly possible,—an old process at the apex and the new at the base.

I think it can be said this probably is not a pneumococcus infection alone, for the reason that she was emaciated when she came here, and she has been of low weight, 80 to 100 pounds for a good while. That makes me think that something longer than a pneumococcus process had been going on. Miss Painter knew this patient in life. She says that the asthma was a very serious problem, laid her up for frequent short periods, and that she was very thin. So we can certainly say there was something there before the pneumococcus infection which we know there was at the end, in the blood anyway.

I am going to say both: tuberculosis presumably at the apex of each lung, very possibly somewhere else; then a terminal pneumococcus infection, probably at the right base, and possibly in the peritoneum too.

A PHYSICIAN: Didn't Dr. Rackemann say that tuberculosis and asthma rarely go together?

DR. CABOT: That is the statement made by a very good man, which has to be borne in mind. Perhaps if she had chronic asthma she did not have tuberculosis.

I think pneumonia is the direct, immediate cause of death, but the cause behind it I think was tuberculosis.

#### CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Bilateral apical pulmonary tuberculosis.  
Lobar pneumonia (right base).

#### DR. RICHARD C. CABOT'S DIAGNOSIS

Pneumococcus septicemia.  
Tuberculosis at apex of each lung.

#### ANATOMICAL DIAGNOSIS

##### 1. Primary fatal lesions

Septicemia, pneumococcus.  
Lobar and focal pneumonia.

##### 2. Secondary or terminal lesions

Soft spleen.

##### 3. Historical landmarks

Slight chronic pleuritis.  
Myomas of uterus.  
Diverticulum of small intestine.

DR. RICHARDSON: There was no evidence of syphilis or of tuberculosis.

The liver was low and reached from side to side, covering the organs of the upper peritoneal cavity, but it was otherwise negative.

The pleural cavities contained a small amount of cloudy fluid and fibrin. There were pleural adhesions on the right, a band to the diaphragm, none on the left. The bronchial glands were moderately enlarged, brown-red, soft and juicy. The apex of the right lung was negative. The

tissue of the upper lobe was spongy, pale red, with moderate edema. The tissue of the lower lobe was similar. The middle lobe was voluminous, solid, and showed frank gray-red to red pneumonia, with the pleura coated with fibrinous exudate. The left lung showed a negative apex, the upper lobe voluminous, solid; frank gray-red pneumonia. The lower lobe showed foci of pneumonia in the upper part. The rest of the tissue showed much edema.

The heart was large. 275 grams, and showed slight dilatation on the right. The valves, cavities and coronaries were negative.

There were a few myomata in the uterus.

The heart blood yielded a typical growth of the pneumococcus.

Dr. CABOT: It is well to look back at the X-ray plate now.

Dr. RICHARDSON: Here at necropsy we found a typical right middle lobe lobar pneumonia.

#### CASE 12362

#### CHRONIC COUGH FOLLOWING EXPOSURE TO TUBERCULOSIS

##### MEDICAL DEPARTMENT

A girl of thirteen entered the wards April 29. The chief complaint was chronic cough.

*Out-Patient Department history.* She was seen in the Out-Patient Department eight years earlier. A diagnosis of acute nasopharyngitis and bronchitis was made. In February, two months before her admission to the wards, she came in complaining of a chronic cold which developed into a severe morning cough, non-productive. She also complained of urinary frequency. The impression gained at that time was of tuberculosis. X-ray showed the diaphragm low but sharply defined on both sides. The costophrenic sinuses were shallow, particularly the left. Respiratory movement was limited on the right, entirely absent on the left. The heart shadow did not appear to the right of the spine. It was small and low, of the drop type. There was coarse mottled dullness extending outward and downward along the course of the bronchi on both sides. The bronchial markings were also unusually prominent. A few dense glands were seen at the hilus. The apices and periphery of the lungs were clear. "A definite pathological process in both lungs which involves the bronchial structures and the surrounding lung substance. The appearance while not characteristic is in the absence of a foreign body in the bronchi probably due to tuberculosis." A tuberculin test at this time was negative. The sputum increased in amount, and in April she was raising large amounts of thin yellow material negative for tubercle bacilli. She was put on postural drainage and referred to the wards for diagnosis and treatment.

#### *History in the wards.*

*Present Illness.* Three years before admission she had an attack of pneumonia which kept her in bed only three weeks, but kept her out of school the rest of the year. Since that time she had had frequent colds every winter, much improved in the summer. During the past winter her colds had seemed much worse and had lasted much longer. For the past four months she had had a chronic cough, more severe in the morning, when she raised large amounts of thick yellowish sputum, never odorous or blood-streaked. She had also had several chills during the past four months. Her general condition had been good.

*Family History.* Her mother had asthmatic breathing at night. One sister had tuberculosis, and there was a definite history of exposure.

*Past History.* She had always been a very thin child, and had always been subject to frequent colds. She had sore throats until her tonsils and adenoids were removed five years ago. Since that time she had had none. She had had no diseases except chickenpox. For the past two years she had had growing pains and pains in various joints. She had an occasional stitch in the axillary line when she ran very hard. She had had no night sweats, hemoptysis or edema. Her appetite was poor. She had no nausea or vomiting except with severe cough. Since she was five years old she had had enuresis. There was considerable leucorrheal discharge. She had recently been gaining weight.

Examination showed an enlarged heart. One examiner believed she had mitral stenosis. The lungs showed diffuse squeaks and râles over the right chest on prolonged expiration. In the back there was a pleural rub at the left base and a small area of bronchial breathing and increased voice sounds, almost egophony. (Plugged bronchus?) The fingers showed slight clubbing.

*Laboratory data.* The urine showed epithelial cells and rare leucocytes; no sugar or albumin. The blood showed moderate anisocytosis on one occasion, red count 5,390,000, leucocytes 12,300 to 19,700. Wasserman negative. Tuberculin tests negative. The sputum was moderate in amount, mucopurulent thin fluid, no blood. It was negative for tubercle bacilli on three occasions. Much pus and many organisms, cocci and bacilli.

X-ray showed ptosis of the heart and diaphragm and emphysema of the lungs. There was a general increase in the hilus shadows and the larger lung markings, particularly in the lower chest. Beneath the heart shadow there was a triangular area of dullness with sharply defined border which occupied the space between the diaphragm and the spine. This shadow with the rather high position of the diaphragm on the left side and the retraction

of the lower half of the left chest was definite evidence of a pathological process behind the heart and the left base. This might be a collection of fluid in the posterior mediastinum or collapse of the lower lobe, more probably the former.

*Note by Dr. Means.* "The signs are those of a pathological process at both bases. Dullness in the left axilla, harsh breathing in the left base, râles in both bases. The history is more suggestive of bronchiectasis than of tuberculosis. Abscess of three years' duration would have produced more emaciation, etc. The X-ray is consistent with bronchiectasis."

#### DISCUSSION

BY RANDALL CLIFFORD, M.D.

##### NOTES ON THE HISTORY

There is no question but that there is definite exposure to tuberculosis in this case. The fact that her sister has tuberculosis makes it probable that at some time this child has been exposed to repeated massive doses of tubercle bacilli at home.

In taking up the history in chronological order we find that her symptoms date back to three years ago following her attack of pneumonia. Previous to this she had been well with the exception of frequent colds, being free from cough and raising no sputum. The fact that she had her tonsils and adenoids removed five years ago has it seems to me little bearing on her case, as her symptoms did not commence until two years later, so that the abscess post-tonsillectomy I feel can be safely excluded. There is no mention made in the history regarding the possibility of a foreign body, and one should always be careful to exclude this as a possible etiological factor in any chronic lung infection, particularly in children.

##### NOTES ON THE PHYSICAL EXAMINATION

The diffuseness of the physical signs over the front of the chest at both bases is consistent with a chronic bronchitis or bronchiectasis.

The X-ray is of interest, showing a definite pathological process at the left base suggesting a collection of fluid or possible collapse of the left lower lobe. In this respect the X-ray and the physical findings do not agree. Certainly the signs at the base are not those of fluid. There is a point here which I should like to mention. In cases of abscess or bronchiectasis associated with the raising of large amounts of sputum there is not infrequently a great difference in the X-ray plates dependent upon whether or not the patient has been put on postural drainage previous to the taking of the X-ray picture. I think it is important to have films taken before putting these cases on postural drainage, and one immediately following the emptying of the cavity or cavities. A great

deal of valuable information can not infrequently be derived from this procedure.

#### DIFFERENTIAL DIAGNOSIS

There is no question but that this child has some pathological process at both bases, most marked on the left. The history dating back to her pneumonia three years ago, the absence of temperature or elevation of pulse, the failure to find tubercle bacilli in the sputum, and the fact that the general condition has been good, all this is more in favor of some chronic lung condition other than tuberculosis. One must bear in mind, however, the fact that because the physical signs are limited to the bases, tuberculosis is not necessarily excluded. There is not enough evidence favoring foreign body to lead one here to recommend a bronchoscopic examination. There are, however, a great many instances in which bronchoscopic examination followed by lipiodol injection is of great aid in diagnosis.

The character of the history together with the facts that the child has had no fever, has gained weight and has been able to attend school are I believe consistent with chronic bronchiectasis following her pneumonia three years ago.

#### TREATMENT

It is extremely important to tell this child the principle of postural drainage and to tell her that she must practice this every morning when she first gets up. She should also be told that on no account should she swallow any of her sputum raised during the day. Cases of bronchiectasis in children frequently do very well when they are taught how to carry on postural drainage. She should also be told that she must control her cough without drugs. This is one of the most important features in treatment, it seems to me. In cases of bronchiectasis the cough is many times very troublesome and the tendency is to put these cases on drugs to control the cough, the result being that the sputum becomes locked up, causing toxemia and danger of secondary pneumonia.

Of course one of the best methods of treatment would be to send her South during the winter to avoid the danger of her picking up a bronchopneumonia, but this is impossible under the circumstances.

#### OUTCOME

The child has kept up a daily practice of postural drainage during the past year. She has gained in weight, has been attending school regularly. She raises little sputum, and the signs in her chest have practically disappeared. She reports regularly every two or three months to the Pulmonary Clinic.

#### DIAGNOSIS

Chronic bronchiectasis.

CASE 12363

AN EPOCH-MAKING CASE OF  
FRACTURED HIP

SURGICAL DEPARTMENT

An unmarried Irish-American woman sixty-five years old entered for the first time April 27, four years before her final admission, drowsy, with very dry cough and extreme acid breath.

For eight years she had been known to have diabetes. She had had polyuria and burning micturition since the onset of the illness. She had been on a diet and had been doing well until two months before admission.

Examination was negative except for emaciation (weight 30 kilos), dry cough, acetone breath and marked arteriosclerosis. The blood pressure was 110/60.

On admission the urine showed 1.4 per cent. of sugar on a diet of 100-100-0. She remained free of sugar after starving for a day on diets ranging from 20-24-50 to 50-50-10. The blood sugar dropped from 0.307 on admission to 0.126 a month later. There was an occasional trace of diaetic acid after she became sugar free. The renal function was 45 per cent., the leucocytes 24,000, the hemoglobin 90 per cent.,  $\text{CO}_2$  51.8 volumes per cent., non-protein nitrogen 48 mgm., creatinin 1.75 mgm.

She showed gradual gain in strength and was discharged at the end of two months. After leaving the hospital she followed diet and remained sugar free, except at irregular intervals, for a year and two months. Then September 11, fifteen months after her discharge, she re-entered with glycosuria and headaches. She now gave a history of occasional edema of the ankles and dyspnea on exertion in recent years and urination six or seven times by day and three times at night.

The urine showed no albumin, a trace of sugar, specific gravity 1.010, renal function 45 per cent., non-protein nitrogen 36.3. Blood sugar at admission 306, at discharge 117, after a diet of 45-40-100 and insulin.

At this admission a questionable mass was felt below the right costal margin with tenderness on deep palpation in the right upper quadrant. X-rays were negative. At discharge October 4 she was "well".

She came to the Diabetic Clinic for the next two years and a quarter. Her blood pressure was about 160, her weight constantly 84. At her last visit to the Clinic January 5, two years and a quarter after her discharge, she was sugar free.

January 11, a week later, she entered the hospital for the third time. The day of admission she had fallen on her left hip and was unable to stand because of severe pain in the hip.

Examination showed an emaciated woman of sixty-nine in considerable pain. There was a

systolic murmur. The artery walls were palpable and tortuous. The blood pressure was 170/90. There was marked swelling over the upper part of the femur. Any motion caused marked pain. The knee was slightly flexed and the upper leg in some abduction. There was angulation of the leg over the femur area. Examination was too painful to elicit crepitus.

The urine was cloudy at fifteen of twenty examinations, alkaline at three, specific gravity 1.005-1.016, the slightest possible trace to a large trace of albumin at thirteen, sugar at fourteen. There is no record of the blood except 8,300 leucocytes January 28. The blood sugar was 364 January 12, too low to read January 14, 326 January 16, afterwards ranging from 232 to 304 three days before death.

X-ray showed a comminuted fracture of the upper end of the shaft of the left femur at its junction with the neck. There was considerable angulation of the fragments. The lesser trochanter appeared to be completely separated. January 14 the alignment of fragments had improved since the last examination. There was some medial displacement of the shaft. By January 26 X-ray showed the alignment of the fragments good. There was a slight amount of overriding; no visible callus. February 18 the fragments were in fairly good alignment in the anteroposterior view.



Comminuted fracture of the upper end of the shaft of the left femur at its junction with the neck. Taken March 12, three months after the accident.

The urine showed no sugar or diaetic acid on admission. On the next two days it showed a large trace of sugar. She was given 300 c.c. of orange juice with four units of insulin the night of admission. At two a. m. there was a large

trace of sugar. Next day she was semistuporous and slept most of the time. She was put on skin traction and on medical orders for insulin, rectal glucose and saline subpectorally. She was placed on constant drainage. The night of the 13th she had a hypoglycemic reaction from which she was brought out by glucose subpectorally and by mouth. Next day she was drowsy.

The condition varied considerably, with ups and downs in appetite and temperature without obvious cause. She was given only five units of insulin daily. By February 20 the traction was off. A bed sore developed and was laid open under gas and packed with dichlororamin T. She was ordered ultra-violet lamp treatment every other day. No further attention to the hip was advised except care in moving. She lost considerable weight and appetite. March 4 she became comatose. The medical consultants were satisfied that this condition was not diabetic in origin. She continued in coma from which she could not be aroused. March 9 she died.

#### DISCUSSION

BY HENRY C. MARBLE, M.D.

This old lady for twelve years had been known to be a diabetic. She had been in the hospital three times for treatment, had been followed in the Diabetic Clinic, and had good care. When last seen she was sugar free and getting on well.

Then she fell and broke her hip. There are four kinds of fractures about the hip. First, the separation of the epiphysis; second, the fracture of the neck of the femur between the epiphysis and the trochanter inside the capsule; third, outside the capsule of the hip-joint and through the trochanter, breaking off the lesser trochanter; and fourth, a fracture just below the trochanter, called the subtrochanteric fracture.

This was an intratrochanteric fracture. It was outside the hip-joint. The X-rays showed that the neck was almost at right angles with the shaft. There was some coxa vara. These cases always unite.

On admission the doctor who had this woman in charge, knowing that he was going to get bony union, treated her so as to get it in the best possible position. She was put in a Thomas splint with the leg somewhat abducted. The alignment of the fracture was improved according to X-ray, the right angle being straightened to a more nearly normal position. She was reduced and held for five and a half weeks, when she developed a bed-sore which later became infected. Then she was taken out of her splint. From the time she developed the bed-sore to the date of death was two weeks.

In my opinion this woman died of infection.

From the surgical point of view we are interested in the condition of this hip. X-rays taken just before she died showed that there was a considerable amount of bone callus about the

fragments. She was able to move her leg in bed. In other words, the weakest sub-standard surgical risk went ahead and united the fracture through the trochanter in seven weeks. She had an old lady's diabetes. She had arteriosclerosis. She had an intratrochanteric fracture of the femur that had united in seven weeks.

#### CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Intratrochanteric fracture of the left femur.  
Diabetes mellitus.  
Cerebral hemorrhage.

#### DR. HENRY C. MARBLE'S DIAGNOSIS

Intratrochanteric fracture of the left femur.  
Diabetes mellitus.  
Arteriosclerosis.  
Decubitus.  
Septicemia.

#### ANATOMICAL DIAGNOSIS

##### 1. Primary fatal lesion

Diabetes mellitus.  
Chronic interstitial pancreatitis with degeneration of the Islands.  
Old fracture of the left femur.

##### 2. Secondary or terminal lesions

Arteriosclerosis.  
Arteriosclerosis of the vessels of Willis.  
Wet brain.  
Decubitus.  
Agenesis of the left kidney and spleen.

##### 3. Historical landmarks

Slight hypertrophy of the left kidney.  
Chronic pleuritis.  
Obsolete tuberculosis of the apices of the lungs.

DR. RICHARDSON: We had permission to examine the head, and as Dr. Marble was greatly interested in the hip, I examined it for him. He has already described it.

Head. There was marked edema of the pia and marked arteriosclerosis of the vessels of Willis. The brain weighed 1260 grams. The tissue was wet,—arteriosclerosis of the vessels of Willis and wet brain. There was no cerebral hemorrhage.

Trunk. The left lower extremity was just a little shorter than the right—not much—and there was a little deformity in the region of the left hip.

In the sacral region there was a large area of decubitus.

There were a few slight old pleural adhesions on the right and one at the left apex. The lungs were negative except that there was a small patch of obsolete tuberculosis at each apex.

The heart was small. All of the organs were small. The heart weighed 215 grams, the liver

826 grams, the spleen very small, nine grams, the right kidney 132 grams, the left kidney not large enough to weigh.

DR. MARBLE: Where had the spleen gone to?

DR. RICHARDSON: She had never had a larger one.

DR. MARBLE: And she had lived all this time on nine grams!

DR. RICHARDSON: Yes. The heart was negative. There was considerable sclerosis of the aorta and a slight to moderate amount in the great branches, more especially in the iliaes. The circulatory apparatus was otherwise negative.

The pancreas was very small. The mass of pancreatic tissue present measured five by three by two centimeters. The tissue was a little firmer than usual, somewhat leathery. Microscopically there were some changes in the islands of Langerhans and some increase in the connective tissue. Originally it was probably a very small pancreas.

The adrenals, the splenic tissue and the right kidney were frankly negative. The left kidney was very small, and the left ureter, which was present, also quite small but opened as usual into the bladder. At the upper end of this small ureter there was a minute mass, one and a half by one centimeter, which on section showed kidney-like tissue surrounding a small cavity into which the ureter opened. The renal artery and vein on the left were very small and extended down to the region of this mass, but then strung out into very minute strands. The bladder was negative.

DR. MARBLE: This bone shows an intratrochanteric fracture which has got solid. This is a seven-weeks-old fracture. It has changed our conception of these things. We used to keep intratrochanteric fractures up for twelve weeks. Now we let them down in six weeks. I think all of these old ladies are grateful to us for this necropsy. This is the only specimen we have. The poorest possible surgical risk unites an intratrochanteric fracture we know in seven weeks.

DR. RICHARDSON: The union seems to be well established.

DR. MARBLE: This necropsy has established a new principle for us as to the time of keeping these people tied up

#### NEW ENGLAND HEALTH INSTITUTE

THE New England Health Institute will meet in Concord, N. H., Sept. 27-Oct. 1, 1926.

These meetings will be of special interest to state and community leaders, health officers, physicians, nurses, educators, pure food directors, social workers, leaders in the public health movement, employers, club women, advertising experts, editors and heads of families. All are invited to attend.

The Institute will include 60 lectures by na-

tional and international authorities on the Conservation of Health.

This splendid course—of great value to every family and every community in New England—is under the auspices of the United States Public Health Service, and the New England State Departments of Health, the Yale and Harvard Schools of Public Health and the departments of public health and biology of the Massachusetts Institute of Technology and Simmons College.

There is no charge for the course except the registration fee of one dollar.

A postcard request—addressed to the State Board of Health, Concord, N. H.,—will bring you a copy of the program.

#### SCHEDULE OF COURSES AND SECTION CHAIRMEN

I. Public Health Administration (6 lectures)—Charles F. Dalton, M.D., Secretary, Vermont Department of Public Health.

II. Preventable Diseases (6 lectures)—Howard A. Streeter, M.D., Health Officer, Manchester, N. H.

III. Sanitation and Engineering (5 lectures)—Arthur D. Weston, Assistant Engineer, Massachusetts Department of Public Health.

IV. Tuberculosis (5 lectures)—Bernice W. Billings, R.N., Executive Secretary, Boston Tuberculosis Association.

V. Venereal Diseases (5 lectures)—Daniel E. Shea, M.D., Chief Division Venereal Diseases, Connecticut.

VI. Child Hygiene (6 lectures)—Mary R. Lakeman, M.D., Assistant Director, Division of Hygiene, Department of Public Health, Boston, Mass.

VII. Public Health Nursing (5 lectures)—Edith L. Soule, R.N., Director Division Public Health, Nursing and Child Hygiene, Maine State Department of Health.

VIII. Social Work (4 lectures)—Helen I. McGilliendy, B.A., LL.B., Executive Secretary, Boston Council of Social Agencies.

IX. Mental Hygiene (4 lectures)—Benjamin W. Baker, M.D., Superintendent Laconia State School.

X. Industrial Hygiene (3 lectures)—David W. Parker, M.D., President, New Hampshire Medical Society, Physician, W. H. McElwain Company, Manchester, N. H.

XI. Foods and Food Control (4 lectures)—Charles D. Howard, B.S., Chief, Division of Chemistry and Sanitation, State Board of Health.

XII. Nutrition (4 lectures)—Alice Blood, M.D., Simmons College, Boston, Mass.

XIII. Health Education (5 lectures)—C. E. Turner, Associate Professor, Massachusetts Institute of Technology, Dept. of Biology and Public Health.

## THE BOSTON Medical and Surgical Journal

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## WELCOME TO CAMBRIDGE UNIVERSITY MEDICAL SOCIETY, ENGLAND

Boston is being favored by the visit of 80 undergraduates, members of the Medical Society of Cambridge University, England, who will be the guests of the Harvard Medical School, September 7 to 10, inclusive.

This party has been making a visit to America covering Canada and several cities in the eastern part of the United States.

The faculty of the Harvard Medical School and friends of the College have arranged an interesting program of instruction and entertainment that will fully occupy the time of the visitors from their arrival until their departure Friday afternoon.

Headquarters of the party will be at Smith Hall, Cambridge, where rooms have been prepared for their use.

### Schedule

#### TUESDAY, SEPTEMBER 7

Arrive Back Bay at 8.35 (daylight saving time). The party will be met by buses and driven to Smith Hall (Boylston Street entrance), Cambridge.

The nights of September 7, 8 and 9 will be spent at Smith Hall Dormitory, Boylston Street, Cambridge.

The courtesy of the Weld Boat Club will be extended to members of the Medical Society.

Hours noted on schedule are daylight saving time.

All luggage should be ready at 9 a. m. on Friday, September 10, so that it may be taken by the truck directly to the New York boat.

The party will not return to Smith Hall after leaving at 9 a. m. on Friday.

Further information may be obtained from the Dean's Office, Harvard Medical School. Telephone, Regent 2380.

#### WEDNESDAY, SEPTEMBER 8

##### A. M.

8.00—Breakfast at Smith Hall.

9.00—By bus to the Medical School.

9.30—Assemble in Lecture Room, Administration Building.

10.30—Visits to Departments of Anatomy, Physiology, Bio-Chemistry and Pharmacology.

##### P. M.

12.30—Lunch at the School of Public Health.

1.30—Visits to laboratories at the School of Public Health, and to the Medical School Departments of Pathology, Bacteriology, Preventive Medicine and Parasitology.

4.00—Tea at the Medical School.

5.00—Motor drive by Staff to Topsfield, Mass., for supper at the home of Mr. and Mrs. Richard Wheatland.

8.30—Return by motor to Smith Hall, Cambridge.

#### THURSDAY, SEPTEMBER 9

##### A. M.

8.00—Breakfast at Smith Hall.

9.00—By bus to the Medical School, for visits to surrounding hospitals.

9.30-10.30—Peter Bent Brigham Hospital.

10.40-11.15—Boston Lying-in Hospital.

11.30-12.15—Children's and Infants' Hospitals.

##### P. M.

12.30-1.15—Boston Psychopathic Hospital.

1.30—Lunch at the New England Deaconess Hospital.

3.00—Motor drive by Staff to Blue Hill Reservation. Walk over the Blue Hills.

5.00—Tea at the home of Mrs. C. Minot Weld, Milton.

6.00—Return by motor to Smith Hall, Cambridge.

7.30—Dinner at the Dormitory to meet members of the Faculty and Internes from Boston hospitals (informal).

#### FRIDAY, SEPTEMBER 10

##### A. M.

8.00—Breakfast at Smith Hall.

9.00—By bus to Massachusetts General Hospital. (Assemble in lobby of Moseley Building.)

9.30-12.30—Visits to laboratories, wards, out-patient department, and demonstrations, Massachusetts General Hospital.

##### P. M.

12.30—Luncheon at the Massachusetts General Hospital.

1.30—By bus to the Boston City Hospital.

2.00—Assemble in the Thorndike Memorial Amphitheatre.

2.00-3.00—Visit the Thorndike Memorial Laboratory.

3.00—Assemble in Waiting Hall of Medical Out-Patient Department.

3.30—By bus to the boat for New York.

At 3.30 they will leave by boat for New York, whence they will sail for England on the Tuscania.

The Entertainment Committee representing the Harvard Medical School consists of Dr. Walter B. Cannon, chairman; Dr. James H. Means, Dr. Stanley Cobb, Dr. Reginald Fitz, Dr. J. H. Mueller and Dr. Henry Viets.

J. D. Simpson of Trinity College of England is in charge of the English delegates.

Boston appreciates the honor of entertaining the undergraduates of Cambridge University and their friends and hopes that the visit will be most useful and entertaining.

We trust that it will stimulate others to visit Boston, for we are sure that all representatives of foreign universities will be cordially welcomed.

#### A DEMONSTRATION! WHAT WILL BE THE EFFECT?

It will be interesting to watch what the ingenuity of the anti-vaccinationists will make of the facts coming out of the recent smallpox experience reported in this issue of the JOURNAL. Black is black and white is white but the touch of ochre that they usually add brings out curious effects.

The situation was compact; the diagnoses competently made; the immunity of those spared infection thoroughly tested—and the contagion did not spread. Once more we have had demonstrated for us the easy opportunities for smallpox infection, the surety of individual protection given by vaccination, and the value of the state statute requiring vaccination.

There are still those who cry that smallpox holds no menace, that vaccination is a frail reed, and who hold mandatory vaccination an outrage, but there was none of that ilk in the party that motored from Orlando to Upton.

The picture is sharp in its contrasts. It will require plentiful pigment and much mixing to blur it.

#### PUERPERAL PYREXIA

The British Ministry of Health has issued an order dated July 31, 1926, which requires reporting of cases with a temperature of 100° or more which have been sustained during a period of twenty-four hours or have recurred in a woman within twenty-one days after childbirth or miscarriage. The act of 1899 made it obligatory to report cases of so-called puerperal fever and it is expected that this act will be modified by legislation to conform to this order of the ministry.

Pyrexia among women following childbirth or miscarriage may not of course be due to so-called puerperal septicaemia but under this order due study may be applied to determine the etiology of any febrile condition among

such cases. The subject is of sufficient importance to justify the annoyance of reporting trivial complications because the early recognition of septicaemia may lead to remedial and preventive measures.

Even in mild cases when there may be little danger to the patient whose case has been reported, it may be of vital importance to other cases in a lying-in hospital, for example, for a mild infection in one patient might be the starting point of a series of serious cases.

Our English brethren have made a distinct contribution to preventive medicine through this order. This nation should follow the example of the mother country. Morbidity statistics will be impressive object lessons and will give valuable information which hitherto has been concealed.

#### THE TUBERCULOSIS SURVEY OF BOSTON

IN 1925 the President of the Boston Tuberculosis Association felt that the exact situation relating to tuberculosis in Boston should be known in order to enable existing agencies to deal with the problems involved more efficiently. This sentiment was a logical response to the contributions which have been given to the Association and should be the basis of further activities by this organization. It should be understood that the Boston Tuberculosis Association has no organic relation to the official public health department but as a voluntary body is in close contact and association with the official organizations, and like many associations interested in health measures, strives to fill in gaps in the health activities of communities.

Dr. Murray P. Horwood (Ph.D.), assistant Professor in the Department of Biology and Public Health in the Massachusetts Institute of Technology, was employed to make a survey of the tuberculosis conditions in Boston. Dr. Horwood's report, consisting of 215 pages of printed matter, was submitted to the Boston Association last year. The report begins with a study of the population of Boston, showing its composition by nationalities, ages and nativity. Statistics show that in 1923 tuberculosis was responsible for 6.8 per cent. of all deaths in Boston, exceeded only by heart disease and cancer. Measures employed to combat tuberculosis are also important in dealing with the etiology of heart disease, for the same care which should be applied to children in combating tuberculosis will tend to prevent the development of some forms of heart disease.

Aside from the contribution of deaths due to tuberculosis by colored people in Philadelphia and Baltimore, Boston stands as having the highest tuberculosis death rate of any of the large cities of the Country and a higher rate than found in the other sections of Mas-

sachusetts. The negroes of Boston have a much higher death rate from tuberculosis than other races in the proportion of 6.7 for white people and 21.9 for negroes.

There has been, however, an impressive decline during the past twenty-five years, the rate for all forms of tuberculosis having declined from 289.8 per 100,000 in 1900 to 100.8 in 1924. Studying the conditions by wards, those sections having the largest proportion of Irish, Scandinavians, negroes and Canadians from the eastern provinces show the highest mortality.

After the general and specific treatment of the conditions found in the city at large, ten recommendations are submitted as follows:

1. That since the death rate from tuberculosis among whites has been consistently higher in Boston than in any of nine other large cities used for comparison, more extensive efforts be made by the official and voluntary health agencies in the city interested in combatting the disease, to further diminish its annual mortality.

2. That, although the negro population in Boston is small, the high mortality rates from pulmonary tuberculosis among them, compared to similar rates among negroes in other large cities of the United States, make it apparent that a special campaign should be waged to diminish the mortality rate from pulmonary tuberculosis among the negroes in Boston.

3. That a tuberculosis demonstration be held in Ward 13, where the negro population is concentrated over a period of 5 years, in order to diminish the enormous mortality from this disease which has prevailed in this ward for years, and that the work of organizing and directing the enterprise be preferably placed with a voluntary health agency like the Boston Tuberculosis Association. Any organization placed in charge of the demonstration should organize the campaign with the cooperation of all the official and voluntary health agencies functioning in that ward, or that may be made to function there, and every effort should be made to coordinate the activities of these agencies to accomplish the aim of the demonstration.

4. That, since the mortality rates from pulmonary tuberculosis in Boston are especially high among the Irish, and Canadians of Irish origin, the anti-tuberculosis campaign be particularly directed among these groups in the city, in order to help reduce the mortality rates for tuberculosis, for the city as a whole.

5. That the anti-tuberculosis campaign be waged particularly in those wards where the survey analyses have shown consistently high mortality rates from pulmonary tuberculosis, to have existed from 1916-1924.

6. That a special effort be made through an extensive health educational campaign, and through the use of existing clinics and sanatoria to combat tuberculosis in the age group from 15-29, and in particular, to diminish the excessive tuberculosis mortality among females over males in this age group.

7. That since males in the age groups over 20, show a marked increase in the tuberculosis mortality, efforts to minimize this condition should be made by all agencies interested in combatting tuberculosis, through health education, improvement of working conditions, the extension of clinic facilities for the industrially employed, and the provision of means for the proper care and placement of sick and recovered patients.

8. That further studies be made of tuberculosis among infants, to the end, that an adequate and sound program may be developed to reduce the high mortality from this disease, among this group.

9. That a special study of tuberculous meningitis be made in Boston in order to determine the most effective methods for diminishing the mortality from this form of tuberculosis.

10. That a campaign be waged among the physicians by the Boston Health Department, aided in any possible way by the Boston Tuberculosis Association in order that the reporting of tuberculosis may be more prompt and complete.

Chapter two is devoted to a study of the clinical facilities for diagnosis, special mention being made of the Boston Sanatorium Out-Patient Department, other clinics with the medical personnel, opportunities for education, decentralization of the clinics, special training of officers in charge of clinics, nursing service, study of contact cases, location of clinics, statistical records, work with special cases, the Director of the Department, a statistical analysis of several groups, better training of diagnosticians, clinical and bacillary diagnosis, disposition of cases and the Chief of Staff, and the various co-operative dispensary and hospital departments.

Following this chapter there are twenty-five recommendations as follows:

1. That since the system of decentralization of tuberculosis clinics has proven to be the best and most effective method and since Boston is the only large city in the United States where the tuberculosis clinic service is centralized it is recommended that the work of the Boston Sanatorium Out-Patient Department be decentralized by the establishment of 13 tuberculosis clinics throughout the city, in the manner outlined in the report each to serve a population of approximately 50,000, and that these clinics be established in the order of the size of the tuberculosis problem in each district.

2. That prior to the establishment of each new district clinic, the proposed medical director of each clinic be required to spend approximately three months under the supervision of the director of tuberculosis clinics for the Boston Sanatorium Out-Patient Department, in order to make available a staff of physicians, trained in the diagnosis and treatment of tuberculosis.

3. That the nursing service of the Boston Sanatorium Out-Patient Department be likewise decentralized by the appointment of 4 supervisors who shall be directly responsible to the superintendent and who shall have under their supervision the nurses operating in each district.

4. That every new nurse entering the service receive personal instruction from her supervisor in the procedure for doing the follow up work, for bringing new cases and contact cases to the district clinic, for conducting a satisfactory educational program, for organizing a uniform and satisfactory system of records, and for making periodic analyses of these records and submitting satisfactory reports.

5. That if the district tuberculosis clinics recommended are established and serve both residents and non-residents, a particular effort be made to segregate the statistics for each group, so that specific information may always be available for Boston residents.

6. That in such cases, where resident and non-resident patients are served, the responsibility for the follow up work among the non-residents be delegated to the social service department; at the

particular hospital or dispensary, where the clinic is located.

7. That the district clinics recommended be so arranged that each will provide 3 morning clinics a week from 9-11 A. M. on Mondays, Wednesdays, and Saturdays, and one evening clinic a week from 7-9 P. M. on Fridays, where a decided need for the latter exists. The Saturday morning clinic should be reserved exclusively for children and other three clinics for adults. At the beginning, only one physician should be assigned to each district clinic, thus making the maximum number of physician clinic hours per week to be provided at the start, equal to 104.

8. That each district clinic established by the Boston Sanatorium Out-Patient Department be available, in suitable cases for consultation purposes to the physicians in that area, and that all consultation examinations be made if possible, in the presence of the private physician, so that the latter may benefit from the instruction of this service. Difficult cases not diagnosed at the district clinics, should be referred to the director at the central clinic for further examination and diagnosis.

9. That evening clinics be immediately established in connection with the district clinics in East Boston, Charlestown, the North End, South End, West End, South Boston, Ward 12, and Ward 13 and in any other district largely inhabited by the industrially employed, to meet once a week for 2 hours, preferably on Friday evenings.

10. That if the proposal to decentralize the work of the Boston Sanatorium Out-Patient Department and to conduct a tuberculosis demonstration in Ward 13 is not adopted, the Boston Tuberculosis Association organize and conduct a tuberculosis clinic in Ward 13, and provide for effective follow up work in the home.

11. That in order to develop a new generation of physicians better trained in the diagnosis and treatment of tuberculosis, the students at the 3 medical schools in Boston be required to spend at least 3 months at the clinics of the Boston Sanatorium Out-Patient Department under the supervision of the director, and that if possible during their period of internship, each be required to spend one month under capable supervision at a well operated sanatorium or tuberculosis hospital.

12. That, in addition to the methods already recommended for developing a large group of physicians trained and experienced in the diagnosis and treatment of tuberculosis, the Boston Sanatorium Out-Patient Department hold special tuberculosis institutes for interested physicians once every year, or once every two years. In order that such institutes may be held, it is recommended that the initiative for their organization be taken by the out-patient department officials.

13. That since the name—The Boston Sanatorium—fails to convey to the uninformed an adequate conception of the character and scope of its work, and is therefore a misnomer, it be changed to The Boston Tuberculosis Department. It is also recommended that the out-patient department be known as the Division of Tuberculosis Clinics, and the institution at Mattapan as the Boston Tuberculosis Hospital.

14. That since the potentiality for the development of the work of the Boston Tuberculosis Department is very great, and its effective service could be materially increased, it is recommended that a full time, capable director be appointed, at a salary sufficiently large to attract the most desirable candidates, in order to relieve the present Boston Sanatorium Trustees of the responsibility for planning, organizing, administering and supervising the work of this department. While a Board of Trustees should still continue to function, its chief task should be to advise with the director and supervise

his acts. The director should extend, coordinate and supervise the activities of the various divisions of the department, and perfect the educational work now being performed.

15. That the position of chief of medical staff for the Boston Sanatorium be abolished since the functions of the position are being adequately performed by other individuals at the out-patient department and the tuberculosis hospital at Mattapan.

16. That when the new Boston Sanatorium Out-Patient Department building is opened at Harrison Avenue and East Concord Street, every possible method be employed to inform old and prospective patients, physicians, health workers, nurses, social workers and others of the change in address, so that a reduction in attendance at the clinics may be avoided.

17. That the practice of employing a special physician at the Boston Sanatorium Out-Patient Department for disposing of positive cases of tuberculosis be discontinued, and that in its place each physician making a definite diagnosis be required to advise, and prescribe for each of his patients.

18. That a health educational program be organized and conducted in the waiting rooms of the Boston Sanatorium Out-Patient Department through the use of simple, attractive, and effective wall charts, posters, and stereopticon slides, and that a capable interpreter be available to explain the health lessons they are meant to convey, and that if the Boston Sanatorium Trustees are unable to undertake this work, it become one of the regular activities of the health educational program of the Boston Tuberculosis Association.

19. That the number of new cases examined annually at the Boston Sanatorium Out-Patient Department be increased to at least 5,000, and that the number of clinic visits during the year be likewise increased to a point between 35,000 and 40,000. These requirements are in conformity with the best standards available today.

20. That in order to find more positive cases of tuberculosis among the contacts under 15 examined at the Boston Sanatorium Out-Patient Department, greater emphasis be placed on the examination of such cases from those sections of the city, where the tuberculosis mortality is especially high.

21. That a decided effort be made to increase the proportion among young adults, of incipient over advanced cases.

22. That the present unsatisfactory ratio of incipient to advanced cases diagnosed at the Boston Sanatorium Out-Patient Department be improved, so that the ratio of incipient to advanced cases will at least be as 2 is to 1, and eventually as 3 is to 1.

23. That greater emphasis be placed on the importance of bed rest in the treatment of tuberculosis during home visits of the nurses, in order to help to diminish the present high mortality among the patients under their supervision.

24. That the system of referring patients to the Boston Sanatorium Out-Patient Department for diagnosis and supervision, by the various hospital out-patient departments be placed on a more efficient business-like basis, in which a memorandum of each case so referred will be forwarded to the Boston Sanatorium Out-Patient Department, for follow up work if necessary, and in which a notice will always be sent to the hospital out-patient department with the diagnosis for each referred case. This should diminish the number of "missed" cases and bring many active cases under effective treatment early in the disease.

25. That the Massachusetts Homeopathic Hospital Out-Patient Department refer its suspected cases of tuberculosis to the Boston Sanatorium Out-Patient Department at Harrison Avenue and East Concord Street, for diagnosis and follow up work, under the plan outlined in the report.

Chapter three is devoted to the treatment of tuberculosis in hospitals and sanatoria and is followed by ten recommendations as follows:

1. That the superintendent and resident physician of the Boston Sanatorium be physicians of recognized ability, efficiency and experience in tuberculosis.

2. That additional facilities to the extent of at least 100 beds be provided at Mattapan, as far removed from the existing institution as possible, for the care and treatment of early and favorable adult cases of pulmonary tuberculosis.

3. That consideration be given to the desirability of placing the tuberculosis hospital and sanatorium at Mattapan under the direction of the Boston City Hospital Trustees, in order to unify the administration and supervision of all hospital facilities provided by the city, and to provide more opportunities for internes and nurses to have intimate contact with the study and treatment of tuberculosis.

4. That in view of the doubtful value of the treatment provided in the cottage wards at Mattapan, the use of these wards be given up, and that those patients now cared for in these wards requiring hospitalization be treated elsewhere in the hospital, according to their needs.

5. That the resident physician at the tuberculosis hospital at Mattapan in fact as well as in name be made entirely responsible for the treatment which each patient receives and that the internes be required to follow the treatment prescribed by him in each case.

6. That all incorrigible, unruly and disorderly patients at the tuberculosis hospital at Mattapan who are unwilling to abide by the rules and regulations necessary for effective treatment be segregated in a separate ward or building and that chronic alcoholics be sent to the proper institutions to the general advantage of the other patients.

7. That the children at the tuberculosis hospital at Mattapan be placed on a more strict and more definite routine of treatment.

8. That since the tuberculosis hospital at Mattapan is a free institution, the proceeds derived from the sale of articles made in the occupational therapy department, be returned to the hospital and not given, even in part, to the patients. Work done in the occupational therapy department should be regarded as a part of treatment, and not as a means of remunerative employment.

9. A function of any tuberculosis hospital or sanatorium should be to determine the capacity of each patient to do continuous labor before he is discharged, and to place him in work which will be compatible with the maintenance of his health. To this end, vocational training should be given to each patient able to profit by it during his stay at the hospital or sanatorium. Such patients after discharge and placement should be required to report periodically at a recognized official or voluntary tuberculosis clinic for examination, in order to determine the effect of their work and environment on their physical condition, and to prevent a subsequent breakdown.

10. That since the care of adult cases of pulmonary tuberculosis has now become a local problem in Massachusetts, legislation be enacted requiring cities and towns to provide suitable treatment for unsettled as well as settled cases of tuberculosis, and provision made by the state to reimburse adequately cities and towns for the care of such unsettled cases.

Chapter four deals with responsibilities and opportunities of the Boston Tuberculosis Association with twenty suggestions as follows:

1. That since the proper development and expansion of the work of the Boston Tuberculosis Association are hampered by the lack of adequate funds, a special effort should be made to acquaint the public with the variety and value of the work now being performed, so that the annual returns from the Christmas Seal Sale may be materially increased, and that attempts be made to obtain large gifts from individuals through special appeals in the press, and through personnel contact with those who might be willing to support the activities of the Association, financially.

2. That the Boston Tuberculosis Association employ an assistant secretary to relieve the Executive Secretary of much of the detailed work, she is now required to do, thus releasing her for the development of plans and policies for the future of the Association.

3. That the lecture service of the Boston Tuberculosis Association be further developed, along the lines advocated in the report, in order to increase its usefulness to industry, the detection of early cases of tuberculosis among the industrially employed, and as a potent influence disseminating information on hygienic living, and the prevention of disease.

4. That the interest of those in charge of the various out-patient departments be enlisted, in order to make it feasible for the Boston Tuberculosis Association to show stereopticon slides, on daylight screens, dealing with tuberculosis, personal hygiene, and sanitation, and to interpret their lessons to the people, in the large waiting rooms, before they are examined.

5. That the Boston Tuberculosis Association assemble several hundred striking and attractive posters describing important health habits, for use in industry, and that these posters be changed every week in a given factory, in order to stimulate interest and attention, and enhance the value of this form of health education.

6. That the Boston Tuberculosis Association offer to employ a trained, capable and tactful Director of Health Education for a period of 3 years, who shall be loaned to the Boston School Department, and placed under the direction and supervision of the Director of School Hygiene, in the Boston public schools, for the purpose of demonstrating the value of introducing a satisfactory system of health education. This system should follow the lines so ably developed in the Newton public schools, which system is considered among the very best in the country.

7. That the Boston Tuberculosis Association attempt to interest the parochial school authorities in establishing open air and nutrition classes in the parochial schools, and that such classes be established primarily in those districts where the tuberculosis mortality is especially high, and that they be used also for the Catholic children discharged from the Camp and Preventorium operated by the Association.

8. That the Boston Tuberculosis Association endeavor to interest the parochial school authorities in establishing a more effective and uniform system of health supervision and follow up work in the parochial schools, and that if for any reason, such a system cannot be introduced by them, that the Boston Health Department be requested to assume the responsibility, and to introduce a satisfactory system capable of handling the problem effectively.

9. That the health crusade worker in the parochial schools obtain special training in making sanitary surveys of school buildings, so that she may make a careful investigation of the sanitary condition in each of the parochial schools, and after presenting specific recommendations for improvement to the proper authorities, follow up the work, until they are actually introduced.

10. That the Boston Tuberculosis Association

offer to assist the State Department of Health, in ways in which its services have already been effectively demonstrated, when the clinics are organized and conducted in Boston, as part of the 10 year Juvenile Tuberculosis Program.

11. That in view of the large number of suspicious cases of tuberculosis which the clinics of the Juvenile Tuberculosis Program will discover in Boston, the Boston Tuberculosis Association seek immediate financial assistance through special appeals to the public and to private individuals to increase its Preventorium facilities so that at least 100 children, and perhaps later, 200 children, both boys and girls, will be accommodated, and that the addition be in the form of the present one-story structure, instead of attempting to construct a large, fire proof and expensive building. Sufficient funds should also be obtained to thoroughly clear all necessary land at the Prendergast Preventorium.

12. That an additional rest period of one hour duration be provided for the Preventorium children during the morning, throughout the entire year.

13. That greater emphasis be placed on health education in the Preventorium School, and that every effort be made to correlate the health work with the other subjects of the curriculum.

14. That the period of treatment provided for each child at the Preventorium be extended to at least 6 months, in order to more effectively demonstrate the value of Preventorium treatment.

15. That the children who are found to be suspicious cases of tuberculosis, and who cannot be accommodated at preventoria, be treated in open air classes organized for that purpose both in the public and parochial schools.

16. That all children admitted to the Preventorium be previously immunized against smallpox and diphtheria where such immunity has not already been established, in order to prevent epidemics of these two diseases, and also because this practice should be part of a complete child health demonstration.

17. The following recommendations about details at the Preventorium are also made.

(a) That sufficient tents be provided while the summer camp is in operation, so that not more than 3 or 4 children will be housed in each tent.

(b) That the playground teachers at the summer camp be requested to remain until 5 P. M. in order to overcome the serious deficiency in supervised play which their earlier departure creates.

(c) That immediate steps be taken to provide satisfactory sewerage and washing facilities, at the summer camp, and consideration be given to the possibility of using the present washing platform as a basis for a large well equipped toilet and wash-room.

(d) That until that time when the dining room at the summer camp can be provided with screened windows, the existing screens be prolonged below the floor level, as a necessary step in keeping out the flies. Fly traps should be substituted for fly paper, and exposed food and organic matter should be thoroughly eliminated.

18. That the Boston Tuberculosis Association employ a capable physician to conduct clinics under its own auspices and at its own headquarters, for the purposes of examining cases applying for assistance through its Placement Bureau, in order to determine whether or not such cases should be placed, the capacity of each individual for continued work, and the type of occupation best suited for each individual. The clinic should also serve the purpose of examining each case that is placed, at periodic intervals, in order to determine the effect of the work on the health of the patient, and to modify the type of work, if necessary.

19. That in order to make the work of the Placement Bureau effective, occupational therapy and vocational training be introduced on a satisfac-

tory basis in all institutions caring for Boston cases of tuberculosis, and each patient be required to have enough of this treatment to fit him for some physical labor after discharge. The Placement Bureau should also be informed of all cases about to be discharged, and the latter should be told of the existence of this service.

20. That the Boston Tuberculosis Association attempt to interest one or more of the charitable agencies in the city to establish work-shops for discharged sanatorium patients along lines so ably developed at the Altro Shops in New York, and that it offer to serve as a clearing house for all patients admitted, as well as the agency responsible for the supervision of the health of the employees.

Chapter five is a study with conclusions relating to tuberculosis and school children with twenty recommendations as follows:

1. That the School Department initiate a movement with the cooperation of other official and voluntary health agencies in Boston, aiming to modify the present State law which requires that each school child be given a physical examination each year and to provide in its place, the requirement that each school child be given a thorough physical examination, 3 times during its grade school career, once, on admission, again, near puberty, and the third time, before leaving school or entering the senior high school. Each examination should last 10 to 15 minutes. Provision should also be made to examine those children more frequently, who are referred to the school physician by the teacher or school nurse.

2. That the present salary of each school physician which is \$996 per year, be increased to \$1500 per year, and that each physician be required to devote at least 3 hours per day, preferably from 9-12, to his official duties.

3. That every effort be made by the Director of School Hygiene to attract school physicians who are really interested in school health work, and that this attitude be further stimulated in the school physicians now employed, through personal conferences with the Director of School Hygiene, and through the arrangement of discussion and lectures by outstanding leaders in the field of school health work.

4. That school physicians employed by the Boston Department of School Hygiene be required to have special training in the diagnosis of tuberculosis in children, and that special institutes to this end be arranged with the Boston Sanatorium Out-Patient Department.

5. That children in each classroom be inspected daily by the teacher or the school nurse, to detect early symptoms of disease, and also for the purpose of referring cases to the school physician for more careful observation. In this way, the proposed plan to examine children thoroughly only 3 times during the grade school career, would not interfere with the adequate medical supervision of the children at all times.

6. That a special series of lectures and demonstrations be arranged by the Director of School Hygiene, during the coming year, so that all school physicians may be instructed in the relationship of certain environmental factors to the health and welfare of the school children, and also in conducting sanitary surveys of schools, to the end that school physicians also may be held responsible for this phase of the school health program.

7. That provision be made to weigh and measure each child at least twice, and preferably 3 times during the school year, in September, February and May, and that a record of each observation be sent to the parents, and that every effort be made to utilize this information in the health instruction of each child.

8. That special instruction classes be organized for those children who are 10 per cent or more under-

weight, and for whom provision cannot be made in the available open air classes, to meet for a two-hour period each week under capable supervision, part of the time for this meeting coming from the regular school program. Each child should be examined thoroughly, be made free to gain, and provided with extra nourishment at each meeting. A rest period of one hour and special health instruction should also form part of the program for each meeting. Follow-up work in the home should be provided, and mothers should be invited to the meetings about once a month in order to hear the physician review each child's progress. Each child should also be required to have a daily mid-morning luncheon and a rest period after school. If the Division of School Hygiene is unable to undertake this task, the Boston Tuberculosis Association should be invited to do so, under the supervision of the Director of School Hygiene.

9. That sufficient open air classes be organized throughout the public schools in the city, to provide facilities for at least 2,000 children, and that these classes be located in those districts where the annual physical examinations show that they are most needed.

10. That in the larger school districts especially, sufficient open air classes should be provided to cover all grades, so that children who are promoted from one grade, and who still need the treatment provided in open air classes, may have such facilities.

11. That all open air classes now in existence, or subsequently organized, be located on the first floor of each building, in order to avoid the unnecessary drain in vitality which the physically sub-normal children must endure, when the classes are located on the upper stories of each school building.

12. That a morning rest period from 11-12, and an afternoon rest period from 1-2, be provided in the daily routine of the open air classes, and that suitable provision be made to permit the children to rest in the horizontal position.

13. That the emphasis in the open air classes should always be placed on the physical progress of each child, even at the expense of its educational progress, and that teachers in charge of such classes be so instructed.

14. That children selected for the open air classes be made "free to gain."

15. That the further provision of steamer chairs for use in the open air classes should cease, and that in their place cots be substituted. If necessary, additional space should be provided in each school, where fresh air is abundantly available, to make it possible for the children to take their rest periods in the horizontal position.

16. That a Director of Health Education be appointed, as recommended in the preceding chapter.

17. The following recommendations refer to school sanitation:

(a) That as far as possible, classrooms should be heated by the direct method and ventilated through the use of open windows, rather than by the direct-indirect or indirect methods, and that the temperature of classrooms be maintained between 65° and 68° F., precautions being taken to humidify adequately the air.

(b) That supplementary heat, preferably by the direct method, be provided at the Washington School to meet the deficiency that now exists during cold weather, and that a separate ventilating system be installed for the toilets, to operate when the plenum system of ventilation is not in use.

(c) That open air classes should not be held in portable buildings, unless they are adequately equipped with heating, washing, drinking and toilet facilities, and that the present portable buildings be replaced, as soon as funds permit, with more permanent and satisfactory school buildings.

(d) That bubbling fountains installed in new schools be of the safe and sanitary variety only, and

that the vertical bubblers now in use in most of the schools be replaced as soon as possible by the more satisfactory type.

18. That the Boston Tuberculosis Association wage a campaign against the use of undesirable bubbling fountains, and common drinking cups in public or semi-public places.

(a) That suitable washing facilities, including warm water, sanitary soap dispensers and individual paper towels, be provided in all the toilet rooms of the Boston schools.

(b) That seats and desks which can be easily adjusted by the teacher be installed in every classroom, and that these facilities be adjusted to the needs of each child at least twice during the school year, and oftener if necessary. The seating of each child should be so determined that the findings of the inspections for defective vision and hearing will be adequately utilized.

19. That the elevator available at the North End Health Unit be used to convey the children attending the Boston Sanatorium Preventorium Class to the roof of this building, where the class is held, wherever necessary.

20. That the Boston Sanatorium Trustees organize similar Preventorium Classes to that in operation at the North End Health Unit in the summer of 1925, to serve other parts of the city.

Taken all in all the document is a painstaking effort to place before those interested in the tuberculosis problems in Boston the fundamental facts with recommendations for more effective treatment of the conditions as the author sees them.

Everybody at all concerned in this very serious responsibility of this community will find the treatment of the subject of interest. To some, especially those connected with the Boston Sanatorium, it has proved to be especially irritating. The Trustees have attempted to discredit the work of Dr. Horwood, claiming that since he is not a physician and is without adequate experience he is incompetent to conduct a survey of this type. This seems almost puerile since the medical profession is under obligation to scientists of many kinds for leadership in many departments of public health work. The schools of public health connected with our large universities and institutions are turning out graduates vastly better informed on many phases of public health than many doctors and in this particular instance the author of this report occupies an honorable position on the faculty of the Massachusetts Institute of Technology.

He has made public health and tuberculosis studies of twenty-nine cities in the United States, and has served as consultant on surveys of the National Tuberculosis Association. He has studied under Sedgwick, Prescott, Winslow, Gunn and Rosenau. If he had criticized the diagnosis of cases or medical treatment of the patients, there might be some ground for the Trustees to stand on but they try to dispose of his work as that of a dabbler in public health matters and his statements of facts as untrue, although based in some important phases on information furnished by a physician long a member of the Board of Trustees.

One other trustee did not sign the report of the trustees published in the daily paper in which Dr. Horwood's survey was criticised. Something of the same quality of criticism has been expressed with respect to the attitude of the President of the Boston Tuberculosis Association and those associated with him who studied the report before it was printed. The President of the Boston Tuberculosis Association has submitted evidence in his possession in reply to the criticism of the Trustees tending to show that patients could secure alcoholic liquors not prescribed as medicines, and other facts which cannot be ignored.

His Honor, the Mayor of Boston, had Dr. Horwood's report in his possession for a considerable time before it was made public. The Chairman of the Board of Trustees of the Boston Sanatorium has since resigned and The Mayor has appointed Dr. Francis X. Mahoney, Commissioner of Health for the City of Boston, to take the position thus made vacant. Dr. Mahoney has an opportunity to add to his reputation. Executive ability, tact and firmness are in order under present conditions.

Criticism of public officials and institutions under their supervision is always an unpleasant task. Fortunately this report has had no political motive behind it and no one connected with this work will gain any added reputation or advantage, except as the cost of certain services were paid. The work was undertaken because of the desire to learn definitely how to improve, if possible, the serious death rate and morbidity record caused by tuberculosis.

It would be well for every disinterested person to read the report carefully and then study the statements of those of the Trustees of the Sanatorium who signed the protest. Certainly Dr. Horwood and the Committee that studied his report are willing to leave the report and the publication of the Trustees to the verdict of an unbiased public. Some good will come of this study. We wish that the Trustees had met the conclusions and recommendations with a different spirit and gone to work to correct any deficiencies.

There is always chance of improvement. A resignation from a responsible position should be a last resort unless one's own associates have deserted the standards of a leader. This does not appear to have been the case with the majority of the Trustees and this board could remedy conditions which are unsatisfactory if it is so disposed.

#### THIS WEEK'S ISSUE

Contains articles by the following authors:

BLUMER, GEORGE, A.B.; M.D. Cooper Medical College, San Francisco 1901; David P. Smith Clinical Professor of Medicine, Yale University Medical School; Member of Association of American Physicians. His subject is "The Febrile

Types of Erythema Multiforme and Erythema Nodosum," page 515. Address: 195 Church Street, New Haven, Conn.

KRANTZ, CLEMENS I., M.D. Johns Hopkins University Medical Department 1924; and

MEANS, JAMES H., A.B.; M.D. Harvard Medical School 1911; Jackson Professor of Clinical Medicine, Harvard Medical School; Chief of Medical Service, Massachusetts General Hospital; Member of the Association of American Physicians, the Society for Experimental Biology and Medicine, etc. They write on "Pigmentation in Myxedema," page 518. Address: Massachusetts General Hospital, Boston.

SULLIVAN, ELIZABETH A., M.D. Tufts College Medical School 1914. She writes on "A Co-operative Psychiatric Service," page 521. Address: 383 Broadway, Cambridge.

WYMAN, EDWIN T., M.D. Tufts College Medical School 1911; Instructor in Pediatrics, Harvard Medical School; Consulting Physician, Boston Floating Hospital; Assistant Visiting Physician, Children's Hospital, and Visiting Physician, Infants' Hospital. Address: 483 Beacon Street, Boston.

HOLMES, GEORGE W., M.D. Tufts College Medical School 1906; Roentgenologist, Massachusetts General Hospital, and Assistant Professor of Roentgenology, Harvard Medical School. Address: 265 Charles Street, Boston.

SMITH, LAWRENCE W., A.B.; M.D. Harvard Medical School 1920; Director of Medical Research and Chief of Staff, Boston Floating Hospital. Address: 40 Wigglesworth Street, Boston.

STOCKBARGER, DONALD C., S.B.; Sc.D. Massachusetts Institute of Technology 1926; Instructor in Physics, Massachusetts Institute of Technology; Member of Electrochemical Society; Associate Member Optical Society of America. Address: Massachusetts Institute of Technology, Cambridge.

PIGOTT, MADELEINE G.; B.S. Tufts College Medical School; Laboratory Technician, E. L. Patch Company, Stoneham, Mass. These five persons are associated in the presentation of the paper entitled "A Comparison of the Antirachitic Potency of Irradiated Cod Liver Oils," page 525.

STEELE, ALBERT E., M.D. Harvard Medical School 1900; Assistant in Bacteriology, Massachusetts General Hospital; Consulting Pathologist, the Faulkner Hospital, and the Lawrence Memorial Hospital, Medford. His subject is "A Case of Infection with *Aspergillus Versicolor*," page 536. Address: 61 Robert Street, Roslindale, Mass.

SCAMMAN, CLARENCE L., M.D. Bowdoin Medical School 1912; Director, Division of Commu-

nicable Diseases, Massachusetts Department of Public Health. Address: State Department of Health, State House, Boston. Associated with him is

DUDLEY, OSCAR A., M.D. College of Physicians and Surgeons, Boston, 1907. Address: 476 Main Street, Worcester. They write on "The Efficacy of Vaccination Against Smallpox," page 538.

HUBER, EDWARD G. Detailed record on page 291, No. 6 of Vol. 195. His article is a continued account of "The Control of Communicable Diseases in Massachusetts," page 539. Address: The War Department, Washington, D. C.

### MISCELLANY

#### ELECTION OF OFFICERS OF THE MASSACHUSETTS ASSOCIATION OF ASSISTANT PHYSICIANS

The annual outing of the Massachusetts Association of Assistant Physicians was held at the Hotel Nantasket, Nantasket Beach, August 25. The following officers were elected for the ensuing year:

President: Dr. C. Stanley Raymond, Walter E. Fernald State School.

Vice-President: Dr. W. Franklin Wood, Danvers State Hospital.

Secretary-Treasurer: Dr. Edgar C. Yerbury, Westborough State Hospital.

### RECENT DEATH

QUESSY—DR. ALFRED HENRY QUESSY, city physician of Fitchburg, died at the Carney Hospital, South Boston, August 26, 1926, at the age of 50.

He was born in Meriden, Conn., in 1876, the son of Irene and Cordelia Quessy, and was educated in the public schools of Fitchburg, the Assumption College and at Grand Seminary, Canada. He took his M.D. at the College of Physicians and Surgeons, Baltimore, in 1902, settled in practice in Fitchburg and joined the State medical society in 1905. For several years he was a councilor from the Worcester North District Medical Society and took a prominent part in the debates in the Council.

He served as medical member of the State Board of Labor and Industries for five years and was medical examiner for several insurance companies and had served as city physician of Fitchburg since 1924.

He was a founder and director of the Franco-American Catholic Federation, organizer of the Fitchburg branch of the Franco-American Foresters, director of the choir of the Immaculate Conception Church at Fitchburg, and a member of the Elks.

Surviving him are a daughter, a brother and a sister.

### NEWS ITEMS

DR. MAYO HAS TO REPORT FOR TRAINING—Dr. Charles H. Mayo has been reminded that he's in the army now. As "Brigadier-General Mayo," of the Army Medical Reserve Corps, he was ordered to report at the Carlisle, Pa., medical field school "for training," effective September 12.

DR. H. M. LANDESMAN is a candidate for Representative from Ward 12, Boston. He has declared himself for:

Education in preventive medicine and healthy communities.

Contagious diseases can and should be reduced in number.

Modification of the Volstead Act to a more rational plane so that the public would gladly conform to the letter of the law, or

Referendum on the Volstead Act.

Garbage must be handled more efficiently.

Sewers must be kept in good condition.

Better facilities for care of cancer cases and the study and prevention of cancer, and many other matters of civic betterment.

THE NEW NORWOOD HOSPITAL—This hospital, erected at a cost of \$250,000, was opened to the public September 1, 1926. It has a capacity of 75 beds. Miss Betty Escke is the superintendent. Money for this hospital was raised by a campaign under the chairmanship of John E. Folan. There are 19 private rooms and the hospital is in conformity with modern requirements.

NURSES' HOME AT THE BOSTON CITY HOSPITAL—The contract for the new Nurses' Home at the Boston City Hospital has been awarded at a cost of \$405,422. The new building is to join the Vose House. In 1923 the Legislature endorsed an increase of appropriation for the hospital to the extent of \$2,000,000 outside the debt limit and \$1,000,000 through current taxation.

### REPORTS AND NOTICES OF MEETINGS

#### NEW HAMPSHIRE SURGICAL CLUB

THE annual meeting of the New Hampshire Surgical Club will be held at Hanover, N. H., September the 13th, 1926. As usual a week-end outing will precede the meeting. The Hanover members, John F. Gile, Chairman, have charge of the general arrangements. Preparations are being made for a golf tournament and supper Sunday evening, September the 12th, at one of the outing club cabins. Monday forenoon, September the 13th, a clinic will be held at the Mary Hitchcock Hospital. The business and scientific program will be presented as usual in the afternoon. Dr. Elmer Carlton, as toastmaster, has the banquet in charge and is arranging a very attractive evening program. The Hanover Inn will be the headquarters at the exceptionally low rate of \$5.00 per day to include everything except the banquet. This meeting presents unusually attractive features and a large attendance is expected.

#### CLINICAL CONGRESS OF PHYSICAL THERAPY

THE Clinical Congress of Physical Therapy in conjunction with the Fifth Annual Meeting of the American College of Physical Therapy will be held at the Drake Hotel, Chicago, October 18th to 23rd, 1926.